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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A New By-Product Sulphate Process

THE recovery of ammonia as sulphate in gasworks and elsewhere is now confronted by so many economic difficulties that any process which promises to lower costs deserves serious consideration. A German chemist, Dr. M. R. Tern, of Zinnowitz, has lately been developing a process whereby the production of the sulphate is carried out without the use of sulphuric acid, and the process is said to have been successfully tried out on the large scale in Germany, where it has been attracting a good deal of attention.

The process looks comparatively simple. The ammonia is driven off by steam. For the production of sulphur trioxide, the spent oxide of the gasworks is roasted, and the sulphur dioxide evolved converted to trioxide in an electric arc. The trioxide and ammonia are then precipitated as ammonium sulphate in an electro-filter, the moisture of the gases and of the air present sufficing for the purpose of the reaction. The amount of current used in the process (which is known as the Tern "Elektrostickstoff" system) is so small that by its use the saving through the obviation of sulphuric acid is sufficient to pay in a short time for the installation of the simple apparatus

required. The ammonium sulphate obtained, known as "Elektroammon," is pure white, and contains about 20 per cent. of nitrogen. Installations having an annual output of 37,000 tons per annum are projected in Germany, where a large plant has already been in operation since the beginning of July at the gasworks at Engelsdorf-bei-Leipzig. The cost of production of "Elektroammon" per 1,000 kg. is said to be from 90 to 100 Reichsmarks less than that of ammonium sulphate as hitherto prepared in the gas industry. According to experiments carried out by the Pomeranian Chamber of Agriculture, "Elektroammon" is equivalent as a fertiliser to ordinary ammonium sulphate. The process, especially on account of its elimination of sulphuric acid, has an obvious interest for all makers of by-product sulphate.

Tests for Carbon Monoxide

FROM the United States Bureau of Mines comes an announcement which at first sight looks like a piece of frivolous humour, but which, on examination, turns out to be a matter of serious importance. It is to the effect that canaries, which have long been used for the purpose of indicating the presence of carbon monoxide during mine rescue operations, have been superseded by Japanese waltzing mice, which are found to be appreciably more responsive to concentrations of this deadly gas. Previously we had not made the acquaintance of the Japanese waltzing mouse, and had no idea of its physical or mental features, but from the official description it is clearly a little creature of some character. "Japanese waltzing mice," we are told, "are thought to be a mutation of the house mouse, and are commonly found in Japan and China. They appear to be unable to orient themselves in a horizontal plane, which results in an erratic running in circles—sometimes wide, narrow, or figure eight, repeated many times in rapid succession. At other times they pivot on one foot, making many gyrosopic circles without stopping. They are totally deaf, this condition being probably due to the same morphological or physiological cause as the running movements."

It is this incessant and eccentric activity that accounts for their selection for the doubtful honour of precedence over the canary. The reason is not very difficult to trace. It is pretty well known that carbon monoxide poisoning is augmented by physical activity, which further increases both the demand for oxygen and the respiratory exchange and circulation of the blood. For this reason, when using animals for detecting carbon monoxide, it is desirable to keep them active and at the same time to minimise activity on the part of the men, so as to increase the sensitivity and widen the time between observable effects in animals and the

effects in man. This may be accomplished to a certain extent with canaries, but ordinary mice and white mice tend to become more inactive and to huddle in the corner of the cage, thereby reducing their sensitivity.

In view of these facts, it was thought that owing to their almost incessant activity, Japanese waltzing mice might be more susceptible to carbon monoxide than either canaries, common house mice, or white mice. It has now been established that they show signs of response to carbon monoxide in advance of those in birds. In the experiments the sensitivity to the gas increased with the degree of activity of the various specimens used. The recovery after exposure was rapid, only a few minutes being required for apparent recovery from a degree of poisoning causing unconsciousness. In the course of other experimental work, it has been proved that guinea pigs are not suitable for detecting dangerous amounts of carbon monoxide. When encountering potentially dangerous atmospheres the Bureau of Mines usually employs mechanical devices, such as the flame safety lamp for detecting atmospheres deficient in oxygen, and the hoolamite carbon monoxide detector for detecting carbon monoxide, but where small animals are required, only canaries have hitherto been used.

The use of small creatures, such as canaries and mice, for exploring and detecting atmospheres contaminated with carbon monoxide, is explained by the fact that, owing to their high metabolic rate and oxygen demand, accompanied by high respiratory exchange and rate of circulation, they respond more quickly than man to a given concentration of gas. This normally allows a margin of time between observable serious effects to the animal and serious effects to man, during which period man may return to fresh air or employ means of respiratory protection. It should be remembered, however, that during the time the animal or bird is incurring a detectable degree of poisoning, man may also be absorbing some carbon monoxide, and may even attain a very discomforting degree of poisoning, especially if the particular animal is more tolerant than the average. The margin of time between effects in the animals and in men is not very wide, and experience with canaries has shown that an occasional specimen may be tolerant enough to fail to exhibit symptoms before serious effects are incurred in men.

A Club that Deserves Support

In every respect save one the annual report of the Chemical Industry Club is satisfactory. The accommodation has been greatly improved, the facilities offered by the Club have been used more freely, and the general tone is loyal and contented. The one exception is found in the membership, which, for no apparent reason, has fallen from 736 to 697. Almost from the beginning the membership roll has been somewhere about the 700 level. That level was reached very quickly, but in spite of the continued desire to reach 1,000 the figure remains almost stationary. Last year's membership stood at 736, which promised further progress. This year it is a fraction short of 700. Even so, that is quite a respectable figure, and an institution that caters successfully for a community

of 700 members connected in one way or another with chemistry and chemical industry is a very valuable and agreeable asset. So the committee and others who work with such zest to make the Club a success have no need to despair, and now the need is known one cannot think there will be a lack of response.

Unfortunately, the drop in membership has affected the income, and there is a deficit for this year of £58, in spite of a saving on the expenditure side of about £60. The remedy is put in the simplest terms by Mr. T. Miller-Jones, the Treasurer: "It is up to every member of the club to look round among his friends and induce as many as possible who are eligible to join." Considering the claims of the Club, no appeal should be necessary; but since the necessity has arisen the only thing to do is to ensure an adequate response.

Books Received

- PHOTO-PROCESSES IN GASEOUS AND LIQUID SYSTEMS. By Dr. R. O. Griffith and Dr. A. McKeown. London: Longmans, Green and Co. Pp. 691. 25s.
- THE ELDER PLINY'S CHAPTERS ON CHEMICAL SUBJECTS. By Dr. Kenneth C. Bailey. London: Edward Arnold and Co. Pp. 250. 12s. 6d.
- ATMOSPHERIC CORROSION OF METALS: THIRD (EXPERIMENTAL) REPORT TO THE ATMOSPHERIC CORROSION RESEARCH COMMITTEE. Discussion held by the Faraday Society, May 23, 1929. London: The Faraday Society. Pp. 320. 5s. 6d.
- AUGUST KEKULÉ. By Richard Anschütz. 2 Vols. Berlin: Verlag Chemie. Pp. 1,660. M.120.

The Calendar

Nov.		
4	Society of Chemical Industry (London Section): "Titanium Oxide Pigments." Noel Heaton. "The Vapour Pressures of Nitroglycerine and Dinitroethyleneglycol." "The Function of Sulphuric Acid in Nitrations." A. Marshall. 8 p.m.	Burlington House, Piccadilly, London
4	Royal Institution, General Meeting. 5 p.m.	21, Albemarle Street, London.
4	Society of Dyers and Colourists (Huddersfield Section): "Dyeing of Indigo and Blue Serges." M. Carter.	Huddersfield.
5	Leicester Literary and Philosophical Society: "Colloids." Miss C. H. Spencer. 8 p.m.	Museum, Princess Road, Leicester.
6	Society of Public Analysts. 8 p.m.	Burlington House, London.
6	Institution of Chemical Engineers: Annual Reception. 8.30 p.m.	New Princes' Galleries, Piccadilly, London.
7	Society of Chemical Industry (Bristol Section): Lecture and Demonstration on "Special Heat and Corrosion-Resisting Steels." 7.30 p.m.	University, Bristol.
7	Chemical Society. 8 p.m.	Burlington House, Piccadilly, London.
7	Society of Chemical Industry (Glasgow Section): "A Central Building for Technical Institutions." Lt.-Col. Sir Arnold Wilson.	39, Elmbank Crescent, Glasgow
8	Society of Chemical Industry (South Wales Section): "Smokeless Fuels and How They Burn." H. J. Hodsman.	Thomas's Café, High Street, Swansea.
8	National Smoke Abatement Society: "Coal and its Combustion." A. McCulloch.	College of Technology, Manchester.
8	Institute of Metals (Sheffield Section): "Nickel-Silver." F. Orme. 7.30 p.m.	University, Sheffield.
8	Oil and Colour Chemists' Association (Manchester Section): "Some Reminiscences of a Government Laboratory." Dr. Fox. 7 p.m.	Milton Hall, Deansgate, Manchester.

The Problem of the Salaried Inventor

By R. Brightman, M.Sc., F.I.C.

Among the problems considered by the Advisory Committee on Intellectual Workers set up by the International Labour Office and the International Committee on Intellectual Co-operation of the League of Nations, to avoid overlapping or duplication of effort on matters which might be regarded as falling within the sphere of either organisation, is that of the salaried inventor. This subject is dealt with below.

It is generally agreed that the progress of industry is very largely dependent on applied scientific research, and in the majority of cases such research, when successful, results in a series of patents. Inventive activity and ability are accordingly of increasing importance to industry, and any influence or system that tends to repress or discourage such activity or discount such ability is a matter of serious concern.

Primarily, the study of the scientific inventor and his position in industry was undertaken by the Advisory Committee on Intellectual Workers set up by the International Labour Office in October, 1928, in the interests of the inventor, but the Committee at once recognised that the growing importance of technical work in industry made it of fundamental importance, to employers and Governments concerned for the progress of industry and the development of technical work, that just and liberal regulations should ensure the willing and unstinted co-operation of those supplying the necessary inventive skill and knowledge. Under modern conditions of industry the independent inventor is a factor of diminishing importance, and technical inventors are usually salaried professional workers.

An Analysis of the Problem

A study of the problem issued by the Advisory Committee analyses the legal position of the status of the salaried inventor in the United States of America, Japan, and the 20 European countries which are chiefly interested in the question, and endeavours to sum up the main tendencies. Most of the systems of regulation, in principle at least, leave the inventor in possession of his patent, but the right to apply for and obtain a patent must be clearly distinguished from the right to effective ownership of the patent.

Although in many cases the invention is the sole property of the inventor, and he has complete liberty to choose his methods of protecting and using his invention, in other cases the invention may belong to his employer as a result either of the circumstances in which it was made or of the contractual relations between the employer and the inventor. The terms of the engagement may be such that the inventor is obliged to hand over to the employer all profit from the results of his invention.

Freedom of Contract

Such a situation may arise even in the countries in which the principle of freedom of contract is adopted as the basis of patents legislation, and no particular provisions are included relating to inventions made by employees. In these countries—the great majority, including Denmark, France, Hungary, etc.—with liberal interpretations by the Courts, salaried inventors may receive reasonable treatment. If, however, employers wish to force their employees to accept stringent conditions in their contracts, and to renounce in advance all rights to their inventions, such a contract has force of law. The position in France is, in fact, regarded as particularly serious, although the Patents Act of 1844 is in principle entirely favourable to inventors. The French Federation of Engineers' Union point out that such contracts are regularly enforced, and the technician to whom they are offered cannot usually afford to discuss the terms. To obtain the employment he requires he must accept the terms offered. Freedom of contract in employment is thus only a legal fiction. In the absence of a written contract the position is unchanged; the employer takes out the patent and the employee would incur dismissal if he attempted to take one out himself.

The situation in France is considered prejudicial not only to the interests of the salaried inventors, but also to the interests of the general public, patents being nearly always granted to some person other than the real inventor. According to the Federation of French Engineers' Unions the following reforms are essential:—(1) Patents should be granted only to inventors; (2) The sale of an invention before it exists

should be prohibited; and (3) Contracts in which an invention had been assigned at a price obviously less than the real value should be declared void.

Attempted Reform in France

Reform of the present position in France has been attempted, a Government Bill having been introduced by the Minister of Commerce in July, 1924, which was examined by the Commission on Commerce and Industry in February, 1925, approved in principle, and adopted (after amendments to make certain points more definite or complete), by the Chamber of Deputies in April, 1927. The Senate, however, in adopting the Bill in March, 1928, introduced certain prejudicial amendments which were refused acceptance by the Chamber of Deputies, where the Bill is at present under further consideration. The Bill, which is concerned only with industrial patents and not with scientific patents, such as it has been proposed to cover by the draft International Convention on Scientific Property, contains special provisions regarding the rights of employees, and is the result of ten years study of the problem, including the examination of memoirs, reports, etc., published by the groups affected, such as the General Confederation of Production, the Federation of French Associations of Inventors, the Section of Technical Workers in the Confederation of Intellectual Workers, the French Society of Scholars and Inventors, the French Association of Civil Engineers, etc.

One object prompting the inclusion of the provisions mentioned was the belief that thereby in future it would be possible to avoid recourse to legal proceedings, the tendency of which, in consequence of the growth of large scale limited liability companies, etc., is to go against the weaker parties. Previous practice has, moreover, made it in the interest of the employee to see that his agreement contains no special clause concerning inventions, because, where such clauses are inserted, they are nearly always for the advantage of the employer and are strictly enforced, while, in their absence, the liberal views taken by the French courts tend to just settlements.

Necessity for Legal Regulation

Objections raised during the discussions of the Bill only emphasised the general agreement on the necessity of laying down legal regulations for protecting the rights of employees who made inventions. Section 33 of the Bill states that the invention made by an employee is his own property, unless it is regulated by the conditions of his agreement, or results directly from the work with which he was entrusted. In the first case, the employee is now entitled to special remuneration, which would be fixed by an Arbitration Committee. In the second case, if it appears that the salary earned by the employee does not provide sufficient remuneration for his services, he may be granted special compensation, which may be fixed by the Arbitration Committee, taking into account both the nature of the work and the profit to the employer.

In several other countries, Switzerland, Japan, Holland, Czecho-Slovakia, etc., the principle of legal exclusion of stringent clauses in contracts has been adopted, a principle which is negative rather than positive in the protection it offers to the inventor.

German Practice

In Germany, however, a third principle may be said to have been adopted, that of definite regulation of the respective rights of the employer and employee. There is no legal system of regulating the rights of salaried inventors in the Patents Act of 1923, but there are at present a number of collective agreements in force which provide definite regulations concerning the rights of such inventors, and which seem to give maximum protection to the inventor by defining the rights of both parties and the remuneration to which the inventor is entitled. These agreements, although comparatively limited in area, are of fundamental importance for the development of the general problem, and they are the result of a long campaign carried on by the supporters of the rights of salaried inventors.

The most important of these agreements is that made on April 27, 1920, between the German Association of Chemical Undertakings on the one hand and the Association of Chemical Employees and Engineers and the Trade Union of Commercial and Industrial Employees on the other, and a distinction is drawn between three classes of inventions.

Three Classes of Inventions

Inventions are classified as "Works Inventions" (*Betriebserfindungen*) when they are the result of collaboration between a number of employees, frequently based on the experience of the employer, so that the invention has not involved more than average occupational activity. Inventions in this case belong to the employer, who has the right to have them patented as such, the employee being excluded from either material or moral benefit from such inventions. "Service Inventions" (*Dienstserfindungen*) are those which arise directly out of the duties involved in the contract of service, including those in which the inventor was engaged for the express purpose of making invention. Such inventions likewise belong to the undertaking, but the inventor has the right to demand that his name be mentioned in the patent. The employee is entitled to corresponding remuneration, the amount and nature of which must be determined by mutual agreement, if the patent is practised, sold, licensed or used for protecting some other patent.

The employee is thus guaranteed appreciable rights in this class of invention, but in the class of "Free Inventions" (*Freie Erfindungen*), which are those made independently of the employee's duties and include all those not covered by the previous classes, full rights are secured for the inventor. Such inventions are the property of the inventor, who may patent them for his own profit, but the salaried inventor must give his own undertaking the opportunity of applying the invention under license, his remuneration being guaranteed for a period of 15 years from the date of application for the patent, apart from the length of the employee's engagement.

A Draft German Bill

A similar classification of inventions and corresponding provisions characterise the collective agreement concluded with the commercial and technical employees of the City of Mannheim in May, 1925, and the same classification of inventions is found in the paragraphs of a draft German Government Bill of December, 1926, concerning labour tribunals which regulate the problem of salaried inventors. Works inventions are those which are so strongly influenced by experiments, preparatory work and suggestions that it is impossible to consider the person entrusted with the work as the real inventor. Service inventions are those made by persons employed to make inventions or where the contract of employment permits the employee to make inventions. Right of ownership of both classes of inventions is granted to the employer by the Bill. All other inventions are considered free, and provisions according to which such inventions should also belong to the employer must be concluded in writing.

In two bills put forward in opposition to this bill a like classification is adopted. According to that proposed by the "Bund technischer Beamten und Angestellten," service inventions are further classified according to whether they are ordered either generally or specifically, or whether they are the result of the free initiative of the employee in the course of his regular activity. The bill sponsored by the "Bund angestellter Chemiker und Ingenieure" lays down the principle that the invention is the property of the employer only by specific agreement in the contract of service. All other inventions are free and remain the property of the inventor even if they are made during his service and with means belonging to the undertaking. The invention clause (*Erfindungsklausel*) of the agreement must contain provisions describing (1) the sphere of activity of the employee within which limits the invention must be made; (2) the form of remuneration to be paid; and (3) the arbitration and conciliation courts competent in case of any dispute.

The Government Bill, as stated, has aroused considerable criticism. The bill has not been discussed by Parliament, but in regard to the respective rights of employer and employee the rival bills differ only in detail from the provisions of the existing collective agreements mentioned above.

This distinction between three classes of inventions may be traced in legal practice in Belgium and in Czechoslovakia

(where the Union of Inventors has urged the desirability of uniform practice in all countries), while the distinction between "free" and "service" or "works" inventions, but not between the two latter classes, is fairly generally made.

Thus the Austrian Patents Act of September 30, 1925, one of the most modern and progressive of all acts regulating this problem of the salaried inventor, recognises only two types of inventions, service and free inventions, and only one class of employees, including all workers and officials whether salaried or not. Service inventions are those made in the course of the normal activities of the employee or which have been inspired by the nature of his work or duties or which have been considerably promoted by the material resources and experience of the undertaking. Special and reasonable treatment is, however, reserved for the employee, except where he was specially engaged for making such inventions and remunerated by a proportionally higher salary. In all cases the inventor has the right to have his name mentioned in the patent, and such right cannot be assigned.

In Switzerland, Italy, Sweden, Hungary, the Union of Soviet Socialist Republics and the United States of America, legal practice or direct legislation enactments are on similar lines. Service inventions made by an employee in the course of or inspired by his normal duties are the property of the employer, but the inventor retains the right to be mentioned by name in the patent, and the practice of research workers employed specifically to make inventions assigning their rights by special agreement is widely recognised. At the same time the right of such workers to definitely higher normal remuneration is frequently stressed, and the absence of a sufficiently high regular salary would be sufficient in certain countries—e.g. Belgium—to annul a stringent clause in the service agreement. In Italy and the United States of America, however, all inventions which are not made by employees engaged definitely to make inventions are the property of the employee.

General Tendencies

Without going into further details of the system or practice in different countries, a fair idea of general tendencies can be drawn from the foregoing summary. No country has a uniform system which gives the employer or the employee the total profit from the invention; everywhere compromises will be found which are more or less favourable to the inventor, and the relatively advanced Austrian Act of 1925 cited above is at particular pains to assess fairly the respective contributions of employer and employee to the making of the invention and its exploitation, and their relative rights to the resultant profit, as well as in the situation arising from refusal or failure of the employer to develop the invention.

The existence of such compromises is, indeed, the logical result of the situation. The rights of the salaried inventor cannot be entirely ignored without a diminution, if not a disappearance, of inventive activity among employees. Under the conditions of modern industry, new and large research departments are continually being established, in which specialists are employed to make inventions, while, on the other hand, it is increasingly difficult for the employer to attend personally to inventive details or make inventions without the assistance of his employees. Any check to the inventive activity of salaried inventors would therefore be of serious consequence to industry.

Research Departments

At the same time the mass of experience accumulated in the research departments of large industrial undertakings, and their material and intellectual resources, increasingly influence the inventive activity of those employed therein, and it is more and more difficult for the employee to make an invention that has not to a greater or lesser degree been influenced by the work on which he has been engaged, and the knowledge of resources placed at his disposal by the undertaking. Moreover, the employer is in a better position to develop the invention on an industrial scale and consequently secure the maximum possibilities of profit from the invention. A rigid system of regulation which deprived the employer of all right not only to the ownership of the patent, but also to the utilisation of the invention in his own undertaking, apart from any consideration of equity, would tend to deprive the salaried inventor, who is usually in a weak and dependent position, of the best chances of utilising and profiting from his invention.

A Generous Attitude

Free inventions are such a negligible factor under modern conditions, that industry would undoubtedly be wise to adopt a generous attitude to such inventors and to encourage the full play of the inventive spirit. In regard to other classes, the inventor should at least be secured the right to be mentioned in the patent, and steps might well be taken to prevent the growing evil of "paper" patents from robbing him of any real credit of prestige incurred thereby. The most satisfactory method of remuneration appears to be that of paying generous salaries to those appointed for and expected to make inventions, and of vesting the ownership of patents and their subsequent development in the employer or undertaking.

Inventions made by other employees who have not been appointed for research work, whether made outside of, or in the course of, their normal duties might well be treated as deserving special consideration and reward depending on the circumstances of the individual cases. It is of primary importance to industry to encourage inventive skill by generous treatment of the inventor; it is of almost equal importance to free industry as far as possible from long and difficult assess-

ment of the respective rights of employer and inventor in particular cases.

A Solution

The concentration of the main inventive resources of industry within specialist research departments offers industry a solution of the problem already approved by legal precept and practice in many countries. Generous remuneration of the research staff, independently of the inventions resulting from their work, is probably the surest method of encouraging inventive skill and resource, while keeping industry unfettered in the exploitation of the resulting inventions.

Such a solution may or may not be supplemented by further legislation along the lines of the Bills at present under consideration, for instance, in France and Germany, or by an extension of the German system of collective agreements, a step which has been indicated as desirable in Holland and in Austria. Such agreements can, however, only be concluded when both parties are represented by powerful organisations with definite ideas on the subject. In this matter there is undoubtedly a need for closer co-operation between defence organisations representing different classes of scientific workers.

Cyanamide and Its Uses

By F. E. Allison

(SENIOR CHEMIST, FERTILISER AND FIXED NITROGEN INVESTIGATIONS, U.S. BUREAU OF CHEMISTRY AND SOILS).

CYANAMIDE (by which term is meant the commercial form of calcium cyanamide) is one of the oldest of the nitrogenous materials produced by artificial processes from atmospheric nitrogen. It is used chiefly as a fertiliser, either applied alone or in commercial mixtures, although a certain percentage is converted into various chemicals for industrial and agricultural uses. The large tonnage manufactured and the present interest of the public in all forms of atmospheric nitrogenous fertilisers make it seem advisable to summarise our knowledge of the behaviour of the material when applied to the soil. The particular need for a discussion of the use of cyanamide is that it has very special properties. Before discussing this, however, it may be desirable to describe briefly its manufacture and properties.

Manufacture

The raw materials used in the making of cyanamide are coal, coke, limestone, and nitrogen from the air. The process of manufacture consists of three principal steps: (1) The production of calcium carbide; (2) the separation of nitrogen from the air; and (3) the final production of calcium cyanamide from calcium carbide and nitrogen.

The first step of the process involves the production of lime from limestone, which is a simple operation consisting merely of heating the coarsely crushed stone in a kiln at a temperature of about 2,000° F. until it is decomposed. The lime is then mixed with coke and heated in an electric furnace to form calcium carbide. At frequent intervals the molten carbide is tapped from the furnace into iron cars, is allowed to cool, is crushed, and is thoroughly powdered.

The second step consists of securing pure nitrogen from the air. Normal air contains nearly 80 per cent. of this element, mixed mostly with oxygen but also with carbon dioxide, water vapour, and relatively small percentage of various other gases. In order to secure the nitrogen free of other constituents, the air is liquefied and by distillation pure nitrogen is obtained.

The third and final step consists of passing the pure nitrogen gas into ovens filled with powdered calcium carbide, with which it combines if the reaction is started by first heating a small part of it to nearly 2,000° F. The heat generated by the reaction carries the process to completion, requiring usually from one to two days in the large ovens commonly used to-day. After it has cooled, the calcium cyanamide is ground to a fine powder, water is added to decompose the remaining traces of carbide and convert any free lime present into the hydrated condition, and a small amount of mineral oil is mixed with the product to decrease dustiness.

Cyanamide usually contains about 60 per cent. of calcium cyanamide, 20 per cent. free lime, 11 per cent. free carbon,

2.5 per cent. water, and small amounts of silicon, iron, and aluminium oxides. It has a total nitrogen content of about 21 per cent. The large amount of lime present, mostly as calcium cyanamide and slaked lime, gives the commercial cyanamide a distinctly alkaline reaction and causes it to react vigorously with any acidic materials with which it may be mixed. Physically, it is a black powder having excellent drilling properties. It is, however, somewhat dusty even after oiling. The black colour is due to the inert carbon present and is of no significance. Workmen who constantly handle the material occasionally show skin inflammation. When exposed to the air, cyanamide slowly absorbs carbon dioxide and moisture, with the production of a surface crust and a slight increase in volume. The change is so slow that it is not an appreciable factor in the commercial use of the material.

It has been estimated that about 75 per cent. of the total world production of cyanamide is applied directly to the soil as a single fertiliser material. Most of this amount is used in Europe. Approximately 9 per cent. is used in commercial mixed fertilisers, almost entirely in the United States. Perhaps nearly 11 per cent. is used in the manufacture of ammonium phosphate and ammonium sulphate, while an additional 5 per cent. is changed into ammonia and various other chemicals for industrial uses.

Fertiliser Practices in Europe and the United States

When the large tonnage of cyanamide used as fertiliser in Europe and the comparatively small quantity used in the United States are considered, it is logical to ask the reason for the difference. The explanation is largely the fact that in most of the countries of Europe a more intensive agricultural system is followed. For the most part the farms are small, labour is cheap, and farm machinery is used on a small scale only. Usually the fertiliser ingredients are broadcast singly from two to four weeks before planting, in contrast to the American practice of drilling a complete fertiliser in the row in contact with or near the seed. The result is that European practices are almost ideal for obtaining the largest yields from crops fertilised with cyanamide.

In attempting to market cyanamide on a scale in the United States comparable to that in Europe, the producers have faced difficulties owing to the inherent properties of the material which limit its use in mixtures. Where used in improper combinations, particularly in large proportions with superphosphate, bad results have frequently been noted, but where used according to the best European practices, equally good results have been secured. This usually requires a change in farm practice, and hence limits the use of the material.

The chemical changes which cyanamide undergoes in different soils are rather complex and can be mentioned only in part. Under optimum moisture conditions there is a rapid conversion to urea, which in turn is broken down to ammonia by biological and chemical action. Small amounts of other compounds, such as dicyandiamide and guanlyurea, both of which are undesirable, may be formed at the same time. These latter compounds, particularly dicyandiamide, greatly retard the formation of soil nitrates and are to a large degree responsible for the slow action of cyanamide. With our present knowledge of the characteristics of cyanamide and how to use it the chances of injuries from such decomposition products are small. They are of importance usually only under abnormal conditions, such as where very old cyanamide is used, where improper mixtures are applied, where excessive quantities are used, where soil conditions are unfavourable for nitrate production, or where the cyanamide is not uniformly mixed with the soil.

Cyanamide in Mixed Fertilisers

The majority of the nitrogenous mixed fertilisers manufactured in the United States are compounded with cyanamide, which is usually used in these mixtures at the rate of 30 to 60 pounds per ton of mixture. The quantity which may be used is directly proportional to the quantity of superphosphate present. When mixed with superphosphate, the lime in cyanamide combines with any free acids present and with a portion of the water-soluble phosphoric acid. If too much is used a reversion of a considerable part of the phosphate to a less available form takes place, together with the production of agriculturally undesirable forms of nitrogen.

The reasons for using cyanamide in mixed fertilisers, in addition to the fact that a cheap form of nitrogen is supplied, may be largely summarised in the one word conditioner. The lime neutralises any free acids present in the mixture, thereby preventing bag rotting, and improves the mechanical condition by its drying action. The result is the production of a mixture which is more easily drilled and less liable to cake.

Commercial fertiliser mixtures in which cyanamide has been used, not exceeding 60 pounds per ton, usually contain little or no calcium cyanamide a few hours after they are mixed. Urea is the chief of the nitrogenous transformation products, but small amounts of other compounds may also be formed. Dicyandiamide does not form in quantities, except where the cyanamide is mixed with superphosphate in bulk in proportions much higher than those commonly used. In the preparation of cyanamide-superphosphate mixtures, the phosphate should be as dry as possible and the temperature be kept from rising appreciably by mixing in small lots or thin layers.

Attempts to produce a cheap available source of phosphorus that is neutral or basic and hence suitable for mixing with cyanamide in unlimited proportions have been made. The phosphate carriers of this type are basic slag and calcined phosphate, both entirely satisfactory but produced in too small quantities to be in very general use. Should these materials or others having similar properties be produced on a large scale in the future and be used in mixtures, it is probable that the quantity of cyanamide which might be used could be increased somewhat above the present practice. There would, however, be a decided limit to the increase.

Cyanamide Used Alone

Where cyanamide is to be used alone, the following precautions are the most important to be considered: (1) Fresh material should be used, since cyanamide that has been stored in bags for a year or more markedly deteriorates in quality unless special precautions have been used to keep moisture and air away from it; (2) cyanamide should not be left in contact with the hands for any great length of time; (3) cyanamide should not be mixed indiscriminately with other materials (it especially reacts with superphosphate and should not be mixed in large proportions with it); (4) heavy applications should be avoided, the maximum application usually being about 150 pounds to the acre; (5) applications should not be made in direct contact with the seed; and (6) cyanamide should not be used on poorly drained or very acid soils, where nitrate formation takes place very slowly.

Rationalisation of Chemical Societies

To the Editor of THE CHEMICAL AGE.

SIR,—Mr. Davidson Pratt's very interesting paper contains one paragraph very closely applicable to our subject: "Rationalisation, on the other hand, requires the utmost exercise of the co-operative spirit, the pooling of the results of research, and of all technical and scientific knowledge, and the subordination of private interests for the general good of the whole industry."

During the discussion, Dr. Ormandy roundly stated that what was wanted was rationalisation within the chemical societies, an observation with which no one, I suppose, will be inclined to quarrel. But, all the same, the profession as a whole does not yet seem to have realised that, owing to its lack of organisation, it remains a formidable stumbling block to the finished ideal of rationalisation. It was the highly organised condition of British labour which made possible the Mond-Turner proposals; conversations at which chemical science ought to have been represented, and would have been represented if the chemical profession had been properly organised.

As Dr. Ormandy remarked, the attitude of many who are in control of our industries is a great obstacle to rationalisation, but science ought to be able to rise superior to the parochial outlook, ought to be the first to set an example in breadth and distance of vision. It has before been stated that in one sense the day of the individual is passed. Organisation now treats with organisation, and the individual must realise that his interests cannot exist apart from the group with which he is associated. Employers equally with labour recognise this fact. The tremendous advances which are being made in industry depend upon the principle. It is a serious hindrance both to industry and the chemical profession that the chemist has not acted upon it.

It is impossible here to discuss the causes underlying this state of things, but it is important that every individual chemist should address himself to the problem and work out a solution for himself. Since organisation is already well begun, it is evident that some have already done this, but partial organisation is not enough, events now move too quickly. The profession as a whole must learn, as most others have, to think in terms of rationalisation, and to act upon its principles.—I am, etc.,

HENRY T. F. RHODES.

Editor, *The Chemical Practitioner*.

175, Piccadilly, London, W.1.

New Chemical Works at Luton

A NEW chemical works has been established in Luton, Alcock (Peroxide), Ltd., a company registered in October, 1928, with a capital of £14,000, having acquired a large factory in Frederic Street, Luton, from Mr. G. H. Barford, of Barford Bros., Ltd., bleachers and dyers, North Street, Luton. Completion is fixed for the end of the year, but by arrangement the purchasers are already partly in possession. The building, comprising a basement and two floors, is so designed as to allow for expansion upwards, and there is ground available on either side to permit of further extensions. It is now in process of adaptation under the personal direction of the governing director, Mr. H. E. Alcock, who will have the assistance of his son, Mr. J. A. Alcock, a co-director. Adaptations are being made which will provide for the rapid manufacture of chemical products having a wide application in the textile and other industries. Already considerable alterations have been effected, and plans have been prepared for the establishment of a laboratory. Technical and commercial staffs will be engaged in the near future, and the directors hope to be ready to launch their full programme at the beginning of the new year.

Chemical Society Meeting

An ordinary scientific meeting of the Chemical Society will be held on Thursday, November 7, at 8 p.m., at Burlington House, Piccadilly. The following papers will be read:—"The Nitration of Aromatic Thiocyanates," by F. Challenger, C. Higginbottom and A. Huntington; and "Studies of the Boron-Carbon Linkage. Part I. The Oxidation and Nitration of Phenylboric Acid," by F. Challenger and A. D. Ainley.

Chemical Industry Club

Report on the Past Year

In the report of the executive council of the Chemical Industry Club, presented to the annual meeting on Thursday evening, it was stated that the Club had had another satisfactory year. The Improvements Fund remained open during this year and, thanks to the generosity of a number of members, it has been possible to effect further improvements in the Club premises and furniture. Additional new furniture for the smoke-room has been purchased and a commencement has been made with the refurnishing of the card-room. These improvements, apart from the complete redecoration of the Club rooms, which falls due every five years, and was authorised during the year, have added greatly to the comfort of the members. The thanks of the Club are due to the executive committee of the West Indian Club for placing their premises at the disposal of the members during the period of redecoration. There are many further improvements which the Committee are anxious to effect and the Improvements Fund still remains open. The Club is greatly indebted to Messrs. E. F. Armstrong, Frank B. Dehn, R. Duncalfe and Oliver Quibell for gifts of etchings, now hanging in the smoke-room.

The Committee again co-operated with various chemical societies and institutions in the arrangements for the annual chemical dinner, and is greatly indebted to Mr. F. A. Greene, who acted as its representative on the dinner committee. This year the arrangements are in the same hands, and the dinner will be held in the Connaught Rooms on November 8, when the chair will be taken by Lord Dewar.

Monthly Meetings

The monthly meetings of the Club were continued during the winter and the committee expresses its thanks to the following for their help in making these meetings so successful by giving the following addresses: Mr. F. E. Hamer, "What we saw in Canada and America: some general impressions"; Mr. J. Davidson Pratt, F.I.C., "Problems connected with National Defence"; Professor J. C. Drummond, F.I.C., "The Significance of the Infinitely Little in Bio-Chemistry"; Mr. Walter Thomas, "The Harvest of the Seas"; and Dr. Charles Singer, "Hygiene and History."

The Executive Committee has nominated the following officers to serve during the year 1929-30: President, Lord Melchett; chairman, Mr. J. F. Ronca; hon. sec., Mr. Arthur J. Chapman; hon. treasurer, Mr. T. Miller-Jones. The following members of the Committee retire under Rule 7: Messrs. Brewis, Coleman, Craig, Greene and Shipston, all of whom, with the exception of Mr. Craig, offer themselves for re-election. The committee is much indebted to the retiring chairman (Dr. Frank B. Dehn) for the very able manner in which he has conducted the business of the committee during his tenure of office, and also to Mr. Craig for many services on the committee. The committee records its thanks to the secretary, Mr. J. Arthur Williams, for his services.

In accordance with Rule 44 the Committee has altered Rule 27 relating to overdue subscriptions.

Subscriptions to the Christmas Fund were received from 187 members and realised the sum of £182 15s. 6d., which was £21 more than was collected the previous year. The thanks of the members are due to the steward and his staff for their excellent services.

The figures of membership as at September 1, 1929, were as follows:—Town, 415; Country, 221; Overseas, 61—total, 697, which compares with a total of 736 at September 1, 1928.

The executive committee is glad to note that greater use is now being made of the Club by members, but it again wishes to emphasise the importance of increasing the membership.

Treasurer's Report

Mr. T. Miller-Jones, in his report for the year, announces that the revenue account shows a deficit of £58 2s. 6d. This is due almost entirely to a serious drop in subscriptions and entrance fees. These two items together are £144 8s. 6d. less than the previous year.

"As treasurer," Mr. Miller-Jones states, "I very much regret to see this, especially in view of the increased comfort that the Club now affords its members, and the very much greater use which has been made of the Club than heretofore.

Reference to the expenditure will disclose that a sum of approximately £122 has been saved as compared with last year. On the other side, some items have been more costly, and have accounted for £60 over and above last year's expenditure, showing a net saving on expenditure side of about £60. Although there is a deficit of £58 2s. 6d., the sum of £65 8s. 7d. has been put to depreciation account as compared with £14 13s. last year. It must be borne in mind that most of the furniture now belongs to the Club, and that has been depreciated at the rate of 20 per cent. per annum, or, in other words, allowing a five years' life. In the ordinary way, this should prove a very liberal depreciation, but in view of the much increased use of the furniture, it is, in my view, wise to make this liberal depreciation for repairs and replacements; but the real point I desire to make in submitting the accounts is the serious falling off in membership. It is up to every member of the Club to look round among his friends, and induce as many as possible who are eligible to join the Club. It is one of the cheapest in the West End of London, it is centrally and conveniently situated, and has most of the advantages of a West End Club. In some respects it has more advantages than the usual West End Club. It is a very convenient meeting-place for members and their ladies; ample dining and sleeping accommodation also exist, and owing to the very high and respectable reputation of Whitehall Court, it is a very important advantage that the Club offers. Given a largely increased membership, the 20 per cent. depreciation on the furniture should be more or less accurate, but without that increased membership, the life of the furniture is likely to be terminated only by senile decay."

Cracking Shale Oil

Effect of Pressure

A STUDY of the effect of pressure in producing gasoline from crude shale oil is being made in the laboratories of the United States Bureau of Mines, Department of Commerce, at the University of Colorado, Boulder, Colorado.

A series of cracking experiments at pressures ranging from atmospheric to 150 pounds pressure was made on the crude shale oil produced in the U.S. Government retorts at Rulison, Colorado. The crude was topped up to 400° F., and this stock was then distilled under pressure. It was found that considerable non-condensable gas was produced when the oil was treated under pressure greater than atmospheric.

When the oil was distilled to dry coke at atmospheric pressure about 7.5 per cent. of the charge was converted into gas. The percentage analysis of this gas was as follows:—Carbon dioxide, 0.5; illuminants, 27.5; oxygen, 2.7; hydrogen, 24.5; carbon monoxide, 1.5; methane, 24.3; ethane, 10.1; and nitrogen, 8.8. Its specific gravity was 0.656 and B.Th.U. was 1,000. The topped oil cracked under pressures up to 150 yielded from 16 to 20 per cent. by weight of dry gas free from hydrogen sulphide. The percentage analysis of this gas was as follows:—Carbon dioxide, 0.6; illuminants, 5.4; oxygen, 3.3; hydrogen, 3.0; carbon monoxide, 6.6; methane, 59.0; ethane, 9.1; and nitrogen, 11.0. Its specific gravity was approximately 0.695 and the B.Th.U. was 1,000.

Retirement of Dr. T. L. Bailey

Changes in Alkali Works Inspection Staff

THE Minister of Health, the Right Honourable Arthur Greenwood, M.P., has appointed Mr. W. A. Damon, B.Sc., F.I.C., as Chief Inspector of Alkali, etc., Works, in succession to Dr. T. L. Bailey, F.I.C., who is retiring from the public service on November 12 next, on attaining the age limit.

Mr. W. A. Damon was born in 1890, and educated at Bedford School and Birmingham University, graduating as B.Sc. in 1910. His first appointment was as chemist at the explosives works of Messrs. Kynoch, at Arklow, Ireland. Subsequently, he was employed by Brotherton and Co., Ltd., first as chemist at their Litherland works, and afterwards as manager at their Workington works. From there he went to the South Metropolitan Gas Co.'s chemical works at East Greenwich, remaining in the capacity of assistant works manager until 1921, when he was appointed to the Alkali Inspectorate to fill the vacancy caused by the death of the late Mr. Herbert Porter. When Mr. Napier Sutton retired at the end of 1927, Mr. Damon was transferred to the London and S.E. Counties District.

Coke-Oven Gas

Economics of Its Use in Industry

At the conference of the Institute of Fuel, in London, on Friday, October 25, Mr. Edgar C. Evans, honorary secretary and fuel officer of the National Federation of Iron and Steel Manufacturers, read a paper on "The Economics of Coke-Oven Gas Utilisation in Industry."

The consideration now being given by the Area Gas Supply Committee to the possibilities of large-scale use of coke-oven gas in this country, he said, together with the developments in Germany of long-distance transmission of coke-oven gas, rendered necessary a critical consideration of the economic possibilities of such a scheme or series of schemes in Great Britain. Reorganisation of the whole of the coking industry of the country was necessary if the iron and steel industry was to be put on its feet. Such a reorganisation would be stimulated if a market could be found for the coke-oven gas that would be available.

Surveying the various industrial areas of the country, Mr. Evans, dealing first with the North-East Coast, submitted that the potential requirements of the iron and steel industry would justify the policy of producers concentrating coking plants in such districts as Tees-side. There were potential markets for gas in areas such as Newcastle and Tees-side for domestic and industrial supply, and schemes were already in being for the supply of coke-oven gas to such areas—for example, Middlesbrough, Redcar, and Newcastle. Taking a broad view of the position, economic prospects of an extensive gas network scheme on the North-East Coast did not appear to be too favourable, and the logical process of development would seem to be along the lines that were already taking place in concentration of coking plants either in steel-producing areas or at a limited number of centres near the seaports. Turning to the Midland area, Mr. Evans expressed the opinion that in Sheffield the average furnace efficiency could be doubled if coke-oven gas were generally available instead of coal.

Petrol from Coal

Interesting details of the progress that is being made in the production of oil from coal were given by Lord Melchett at the dinner of the Institute, on Thursday, October 24. "We are working on the problem now," said Lord Melchett, "and when in the not far distant future we have achieved our object, we shall open up a new era for the coal trade of this country. One does not wish to be rash in prophecy on technical subjects. All I can say is that we have been running for some time a considerable number of motor-cars on petrol extracted from Durham slack. The petrol has been excellent, and we have had no complaints. We are now proceeding on a larger scale with those experiments. Technically the problem is soluble; the economics are a more difficult subject, but I am getting more hopeful as we proceed with the study of the subject than I have ever been. We certainly intend to continue our researches on a more considerable scale, because the national advantages to be gained are so great that we feel we are entitled to spend money on further research."

Merger in the Belgian Drug Industry

THE Belgian Union Chimique now owns 51 per cent. of the stock of the Pharmacie Centrale de Belgique. Apparently, the Union Chimique and the Pharmacie Centrale have for some time been strong competitors in the pharmaceutical trade, with unsatisfactory results to both organisations. The latest arrangement results in the pharmaceutical marketing being turned over to the Pharmacie Centrale, the Union Chimique handling the manufacturing side. In the latter part of June, the capital of the Pharmacie Centrale was raised from 30,000,000 to 38,000,000 francs by the creation of 80,000 new no-par-value shares. These 80,000 shares were handed over to the Union Chimique in return for the commercial department of its pharmaceutical business and certain holdings in the Compagnie Generale pour le Commerce des Produits Pharmaceutiques au Congo (Cophaco), the latter being an important pharmaceutical company in the Congo and a subsidiary of the Pharmacie Centrale. Evidently the Union Chimique has bought on the open market the remaining shares necessary for its majority control. The Union Chimique is steadily following its policy of buying up other chemical companies.

Utilisation of Smelter Fumes

Important Development in Canadian Chemical Industry

CANADIAN INDUSTRIES, LTD., has awarded the contract for the erection of a plant at Copper Cliff, near Sudbury, Ontario, for the utilisation of waste gases from the International Nickel Co.'s nickel-copper smelter. The plans involve an expenditure of about \$1,500,000, and the plant will be equipped for the production of sulphuric acid and nitric cake (sodium hydrogen sulphate). The bulk of the sulphuric acid produced in the first instance will be used for the treatment of sodium sulphate taken from deposits in Saskatchewan, and the nitre cake produced therefrom will be supplied to the International Nickel Co. for use in the reduction of their nickel-copper ores. From time to time, it is expected that new developments in the utilisation of waste smelter fumes may justify the erection of additional units for the production of other chemical products. Canadian Industries, Ltd., is engaged at the present time in active research work along these lines.

It will be recalled that the Barium Reduction Corporation of Charleston, West Virginia, is engaged on the erection of a plant at Horseshoe Lake, near Ormiston, Saskatchewan, for the recovery of sodium sulphate from the large deposits there. The plant is expected to be ready for commercial production by June of next year. The company is stated to have a contract for the supply of 25,000 tons annually to the International Nickel Co. and expenditures on the Horseshoe Lake development are likely to total about \$500,000. Another company, Natural Sodium Products, Ltd., is understood to be spending a similar amount on the rebuilding of the sodium sulphate plant at Dunkirk, Saskatchewan, which was recently destroyed by fire.

The utilisation of the natural sodium sulphate deposits of Saskatchewan as a source of supply in the manufacture of nitre cake, used in large quantities in the nickel-copper industry, therefore provides an encouraging outlook for the development of these vast deposits. Sodium sulphate or salt cake is also used in pulp and paper mills, for which large quantities have been hitherto imported into Canada.

Carriage of Bromine

Action over Injury to Carman

ON Wednesday, in the King's Bench Division, Mr. Justice Rowlatt concluded the hearing of an action by M. Gallagher and Son, of Dublin, against Harrington Bros., Ltd., chemical manufacturers, of Oliver's Yard, City Road, London, E.C. The plaintiffs claimed to be indemnified by defendants for the payments made by them as compensation to Owen Larney in respect of personal injury sustained by him whilst conveying bromine in the course of his employment.

Plaintiffs' case was that defendants instructed Palgrave Murphy and Co., shippers, to receive five cases of bromine for delivery to Lennox Chemicals, Ltd., of Dublin. Palgrave, Murphy and Co. accordingly notified the plaintiffs, who are carters, to deliver to Lennox Chemicals, Ltd., and in May, 1925, Larney went to collect the cases. Larney loaded the cases, but was unaware of the danger of bromine. He then noticed brown smoke coming from the cases, which were not marked to show that they were dangerous. He drove out into the air, and was injured by the escaping gas, and had not yet returned to work. Compensation was paid at the rate of 35s. a week, and plaintiffs now claimed to be indemnified, as they alleged the defendants were the owners of the bromine, which was at the time at their order. They said that defendants knew its dangerous character, but failed to give notice of the danger to the plaintiffs or the carman.

Defendants denied that they were the owners of the bromine, and alleged that Larney was negligent when loading the cases by breaking one case, which brought about the trouble.

His Lordship did not think the defendants had satisfied the duty which lay upon them, and the plaintiffs were entitled to recover. Judgment accordingly. A stay of execution was granted.

Appointments Vacant

CHEMIST with experience in manufacture of titanium pigments for paint and associated trades. Details on p. xxvii.

RESEARCH CHEMIST for colliery company, with experience in by-products. Details on p. xxvii.

From Week to Week

MR. J. C. SELBIE, B.Sc., A.I.C., has been appointed an assistant chemist to the Anglo-American Petroleum Co., Ltd., and is leaving for Mexico to take up work there.

A PATENTS BUREAU has been established by the Chamber of Trade of the Union of Socialist Soviet Republics at 24, Ulitz Gerzena, Leningrad, Russia. The director is Professor J. J. Heifetz.

THE ANNUAL REPORT of the administrator of the mandated territory of Nauru states that 594,825 tons of phosphate were shipped during 1928, the sales being in the following proportions: Australia, 77.96 per cent., and New Zealand, 22.04 per cent.

ARTIFICIAL WOOL is being produced in two factories in the Roubaix district of France. At present, the synthetic product is more expensive than the natural one, but it is hoped to reduce the present cost considerably when production methods have been increased in efficiency. Vegetable fibre is said to form the basis of the new product.

AT THE ANNUAL CHEMICAL DINNER, to be held on Friday, November 8, at the Connaught Rooms, London, Field-Marshal Sir George F. Milne, G.C.B., G.C.M.G., Chief of the Imperial General Staff, the guest of the evening, will propose the toast of "Chemistry and Industry," to which Lord Dewar, who has kindly consented to preside, will respond.

IMPERIAL CHEMICAL INDUSTRIES are believed to be proposing that Northwich brine should be conveyed by pipe line to Widnes for the manufacture of chemicals. The Northwich Council have asked the County Council to take steps to secure legislation to make provision for adequate compensation for damage to public and private property by the pumping of brine.

WAIKATO CARBONISING CO., LTD., with a capital of £100,000, is being formed in New Zealand for the purpose of applying a carbonisation process to Waikato coals. Capital is being arranged by four Waikato coal companies: the Taupiri, Pukemiro, Waipa and Renown Collieries, Ltd. A contract has been completed with Fuel Industries, Ltd., London, and a two-unit plant ordered.

A DINNER has been arranged by the Yorkshire Section of the Society of Chemical Industry and the Leeds Section of the Institute of Chemistry. It will take place at the Great Northern Hotel, Leeds, on Thursday, December 5, at 7.30 p.m. Tickets, price 6s., are obtainable from the secretaries, and applications should be addressed to them at the University, Leeds. The number will be limited. Dress will be optional.

THE PRODUCTION OF PAINT, pigments and varnishes in Canada increased by about 10 per cent. in 1928, the total value reaching \$27,868,046, as compared with the 1927 production valued at \$25,229,454. Factories in operation numbered 68, of which 33 were located in Ontario, 18 in Quebec, 8 in British Columbia, 5 in Manitoba, 2 in Alberta, 1 in Nova Scotia and 1 in New Brunswick. Capital employed in the industry totalled \$24,256,008; the average number of employees was 2,881; expenditures for salaries and wages amounted to \$3,967,295; materials cost \$14,489,934 delivered at the works; and the value added by manufacturing was \$13,378,112. Imports of paints, pigments and varnishes into Canada during the year were valued at \$5,549,481 and exports (including re-exports) were worth \$520,847.

OFFICIAL NOTICE has now been given to the management of the British Empire Trade Exhibition to be held in Buenos Aires in 1931, that His Majesty's Government have recognised the importance of the occasion and decided to participate on a suitable scale. For this purpose the Government exhibits will be housed in one of the finest buildings in the extensive Exhibition grounds, which have been generously lent by the Argentine Rural Society. The Government exhibits, besides illustrating the contributions of the British people to the world's progress, will show much of the development of our British Colonies and Protectorates. The Dominion of Canada has already reserved another building of 40,000 square feet, thus demonstrating the increasing interest taken by the Canadian Government and Canadian manufacturers in South American trade.

THE COMMITTEE set up under the chairmanship of Sir Charles Sargant to consider whether any amendments in the Patents and Designs Acts, or any changes in Patent Office practice, were desirable, are continuing their meetings at the Board of Trade for the purpose of hearing evidence from interested persons and associations. Four meetings of the committee took place before the vacation, and during the next few weeks evidence will be taken from representatives of Trade Marks, Patents and Designs Federation, Ltd., the British Science Guild, the London Chamber of Commerce, the International Association for the Protection of Industrial Property (British Group), the Association of British Chemical Manufacturers, and the Chartered Institute of Patent Agents. Persons who desire to submit any further suggestions, or to give evidence, are invited to communicate with the secretary, Mr. R. W. Luce, Industrial Property Department, Board of Trade, 25, Southampton Buildings, London, W.C.2.

THE SPANISH GOVERNMENT has approved the building of an oil refinery at Barcelona capable of turning out 200,000 tons of petrol a year.

INDIAN PRODUCTION OF AMMONIUM SULPHATE amounted in 1928 to 15,085 tons, as compared with 13,451 tons in 1927 and 12,555 tons in 1926. Almost the entire production was from coke ovens.

OERTLING'S STANDARD ANALYTICAL BALANCE No. 7SBT, mentioned in our advertisement pages on October 26 (p. x), should have been described as having a sensitivity of 0.0001 grams, and not 0.001 grams, as was stated.

VARIOUS DIPHENYL DERIVATIVES are being produced by the Federal Phosphorus Co., of Birmingham, Alabama. They include chloro-derivatives (sold under the name "Arochlor"), as well as nitro-, amino-, and sulpho-derivatives.

THE TOTAL OUTPUT OF CADMIUM in Canada during the first six months of 1929 was 501,242 lb., worth \$451,118, as compared with 161,908 lb., valued at \$80,954. The output of this metal during the year 1928 reached 491,894 lb., valued at \$341,374. It is evident, therefore, that production this year has continued at a rate more than double that of 1928.

THE I.G. and the German Glanzstoff rayon concern have signed an agreement with regard to the allocation of quotas for the German market for viscose rayon. It is thought that this agreement may be the beginning of a general understanding between producers serving the German market, and that an international viscose convention may be formed.

DR. C. H. LANDER, Director of Fuel Research, will deliver a public lecture on "Physics in Relation to the Utilisation of Fuel" before the Institute of Physics on Wednesday, November 27, at 5.30 p.m., in the rooms of the Institute of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2. The lecture is No. 15 of a series entitled "Physics in Industry."

THE PRODUCTION OF QUARTZ (SILICA) in Canada last year totalled 282,522 tons, valued at \$523,933, as compared with 233,984 tons, valued at \$496,364, delivered from Canadian deposits in 1927. The output during the first half of 1929 totalled 120,423 tons, valued at \$210,831, as compared with 99,845 tons, valued at \$221,845, during the corresponding months of 1928.

BEESWAX is a relatively important export from the Dominican Republic. 146 metric tons were shipped from the country in 1927, the United States being practically the only buyer. Detailed figures covering the exports of 1928 are not yet available, but it is believed that the shipments of beeswax from Dominican ports reached a somewhat greater aggregate than in 1927.

THE LINDE ICE MACHINE JOINT STOCK CO. is building a new acetylene plant at Essen. With an initial cost of 500,000 marks, exclusive of cylinders, and 50,000 kilos. monthly capacity, the new plant is expected to effect extensive freight savings by eliminating long distance shipping charges on cylinders which would have been required by distribution from the Dusseldorf plant after appropriate expansion from its present 60,000 kilos. monthly capacity.

AN IMPORTANT MERGER has taken place in the German cement industry. The Portland Cement Works of Heidelberg, the Dyckerhoff and Sons Portland Cement Works of Mainz, the Schwenk Cement Works of Ulm, and the Silesian Portland Cement Industry Co. of Oppeln, have decided to co-operate and to enter into further agreements which, it is reported, will cover sales and prices. These four firms have a 50 per cent. participation in the entire German, Portland cement production.

THE TWELFTH STREATFIELD MEMORIAL LECTURE has been fixed for Friday, November 22, at the Institute of Chemistry, with Professor Arthur Smithells in the chair. The lecturer, Mr. Lewis Eynon, B.Sc., F.I.C., has chosen for his subject "The World's Sugar Industry." The lecture is open to Fellows and Associates and registered students of the Institute, and former students of Finsbury Technical College. Tickets may also be obtained by other persons interested on application to the Registrar, the Institute of Chemistry, 30, Russell Square, London, W.C.1.

A NITROGEN-FIXATION PLANT based on the Haber-Bosch process is to be erected at Long Beach, California, by the Shell Chemical Co., a unit of the Shell Development Co., which is a subsidiary of the Shell Oil interests. An expenditure of \$250,000 within six months in erecting the first unit of the plant is planned. One thousand men will be employed in the first unit and ultimate investments will total \$5,000,000. Electricity will be used for power. It is believed that the Shell Oil interests contemplate the utilisation of natural gas, of which the oil fields near Long Beach have a great excess, in the manufacture of carbon black, and that the hydrogen evolved in this process will be used in making ammonia in the nitrogen-fixation plant.

Obituary

MR. THOM J. DEE, vice-president and treasurer of the Davison Chemical Co., Baltimore, U.S.A.

MR. R. W. CRABTREE, of Leeds, founder of the firm of R. W. Crabtree and Co., Ltd., on Tuesday, October 22.

MR. GEORGE F. WHITE, Professor of Chemical Engineering at Clarkson College of Technology, Potsdam, New York.

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- Glycerin used to reclaim China wood oil. E. Steinhoff. *Oil and Fat Industries*, October, pp. 25, 43.
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- ORGANIC.**—I : 2-Benz-3 : 4-anthraquinone. L. F. Fieser. *J. Amer. Chem. Soc.*, October, pp. 3141-3148.
- A new petroleum by-product: Octane-sultone. E. L. Baldeschwieler and H. A. Cassar. *J. Amer. Chem. Soc.*, October, pp. 2969-2978.
- PLANT.**—The selection of mayonnaise equipment. A. K. Epstein. *Oil and Fat Industries*, October, pp. 12-13. Discusses the effect of metals on the keeping qualities and nutritional value of mayonnaise and salad dressing.
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German

- ANALYSIS.**—A rapid method for the microchemical determination of copper. G. Spacu and J. Dick. *Zeitschrift analytische Chem.*, Vol. 78, Parts 7-8, pp. 241-244.
- A new rapid method for the microchemical determination of mercury. G. Spacu and J. Luciu. *Zeitschrift analytische Chem.*, Vol. 78, Parts 7-8, pp. 244-247.
- The potentiometric determination of iron with permanganate. T. Heczko. *Zeitschrift analytische Chem.*, Vol. 78, Parts 7-8, pp. 247-249.
- The determination of perchlorates. O. S. Fedorova. *Zeitschrift analytische Chem.*, Vol. 78, Parts 7-8, pp. 249-268.
- Micro-permanganometric studies. J. Mika. *Zeitschrift analytische Chem.*, Vol. 78, Parts 7-8, pp. 268-297.
- APPARATUS.**—Dr. F. W. Müller's analytic ultra-lamp. K. Götz. *Chemiker-Zeitung*, October 23, pp. 824-825.
- CELLULOSE.**—The velocity of decomposition of viscose solutions. O. Faust. *Berichte*, October 9, pp. 2567-2573.
- GENERAL.**—The oxidation of ammonia by lime to calcium nitrate. K. Leschewski and K. A. Hofmann. *Berichte*, October 9, pp. 2509-2514.
- The oxidation and weathering of linseed oil coatings. II.—J. D'Ans. *Zeitschrift angewandte Chem.*, October 19, pp. 997-999.
- Working with mercury. A. Stock. *Zeitschrift angewandte Chem.*, October 19, pp. 999-1001. An account of precautions for preventing mercury poisoning.
- The determination of phenols in the effluents of lignite distillation plants and their extraction. P. Rosin and H. Just. *Zeitschrift angewandte Chem.*, October 5, pp. 965-968; October 12, pp. 984-987; October 19,

pp. 1002-1007. The development of methods of phenol determination in lignite distillation effluents; the testing of the washing effect of various extraction media with regard to the removal of phenol from the effluents; benzol is unsuitable, but an addition of 20 per cent. of aniline increases the washing effect considerably; considerations on the technical applicability of the use of an aniline-benzene mixture for the removal of phenols from lignite distillation waters.

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The iodine and oxygen values of sol- and gel-caoutchouc. R. Pummerer and F. J. Mann. *Berichte*, October 9, pp. 2636-2647.

Miscellaneous

ANALYSIS.—A new method of determination of benzene and toluene in their mixtures. S. Uemara and Y. Kosaka. *J. Soc. Chem. Ind. Japan* (supplemental binding), October, p. 279B (in English).

APPARATUS.—Apparatus for the continuous purification of mercury. E. Botolfsen. *Bulletin Soc. Chim. France*, August, pp. 782-784 (in French).

Graduated burettes furnished with calibrated bulbs for precision volumetry. A. Tian. *Bulletin Soc. Chim. France*, August, pp. 778-782 (in French).

CATALYSIS.—The catalytic reduction of carbon monoxide under normal pressure. III.—The preparation of liquid carbohydrates by means of the cobalt-copper-thoria catalyst. S. Kodama. *J. Soc. Chem. Ind. Japan* (supplemental binding), October, pp. 285-286B (in German).

GENERAL.—The oxidation and reduction of the silicates of iron by gases. B. Bogitch. *Comptes Rendus*, October 14, pp. 581-583 (in French).

The change in the water-soluble phosphoric acid content of superphosphate during its storage in heaps. I.—I. Shoji and E. Suzuki. *J. Soc. Chem. Ind. Japan* (supplemental binding), October, pp. 272-274B (in English).

OILS.—Researches on sulphonated oils. VI.—The reaction mechanism between the aqueous solution of sulphuric acid esters of oxy fatty acids and salts. VII.—Preparation and properties of the pure acid salts of the alkali metals and the sulphuric acid ester of ricinoleic acid. K. Nishizawa, K. Winokuti and T. Kikuti. *J. Soc. Chem. Ind. Japan* (supplemental binding), October, p. 277B, 278B (in English).

ORGANIC.—New derivatives of naphthoquinone. R. Lantz and A. Wahl. *Bulletin Soc. Chim. France*, August, pp. 744-754 (in French).

Researches on the naphthoindigotins. A. Wahl and J. Lobeck. *Annales de Chim.*, July-August, pp. 156-202 (in French).

PHASE RULE.—A study of the quaternary system water-sodium nitrate-sodium chloride-sodium sulphate. A. Chrétien. *Annales de Chim.*, July-August, pp. 9-155 (in French).

SOAP.—The soaps of the fatty acids of the oleic series. III.—Sodium oleate. IV.—Sodium zoomarate. M. Hirose and T. Shimomura. *J. Soc. Chem. Ind. Japan* (supplemental binding), October, pp. 263-265B, 266-268B (in English).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

- 319,308. DYESTUFFS, MANUFACTURE OF. British Celanese, Ltd., 22 and 23, Hanover Square, London, S.W.1, D. H. Mosby, H. C. Olpin and G. H. Ellis, of British Celanese, Ltd., Spondon, near Derby. Application date, June 18, 1928.

Unsulphonated azo dyestuffs are obtained by coupling diazo compounds of 2:4-dinitro-6-alkoxy or alkyl-anilines or derivatives with suitable coupling components. These dyestuffs are readily dischargeable by any of the ordinary reducing discharges, *e.g.*, formaldehyde-sulphoxylates or formaldehyde-hydro sulphites. The dyestuffs are particularly suitable for colouring cellulose acetate or other cellulose esters or ethers. Suitable diazo components include 3:5-dinitro-*o*-anisidine, 3:5-dinitro-*o*-phenetidine, and 3:5-dinitro-*o*-toluidine. Suitable coupling components include aniline, alkyl-anilines aminophenols, or their homologues or substitution products or other coupling components of the benzene series, pyrazolones or aceto-acetic ester or arylides. The most valuable dyestuffs are obtained by employing a coupling component of the naphthalene series, particularly α -naphthylamine or a nuclear or N-substitution product capable of coupling in the para position to the amino group. The coupling components may be α -naphthylamine, an alkyl-naphthylamine, an amino-naphthol, or 1-amino-2-ethoxy-naphthalene. Coupling components containing ω -hydroxy groups, *e.g.*, ω -oxyethyl- α -naphthylamine and γ -chlor- β -oxy-propyl-1-naphthylamine are particularly suitable.

- 319,382. COAL GAS, PURIFICATION OF. The Manchester Oxide Co., and R. H. Clayton, Ltd., Canal Street, Miles Platting, Manchester. Application date, May 23, 1928.

Tar fog is removed from coal gas by taking the gas from between the hydraulic main and the condensers and passing it up a tower maintained at a temperature above that of the dew point of the gas for water, and filled with loose packing such as Raschig rings. If an absorbent such as dephenolated tar is fed into the tower, a considerable proportion of the other oxidisable bodies may also be removed from the gas, which reduces the contamination of the ammonia still effluent liquor. The dephenylated tar may be subsequently treated for the removal of phenolic substances absorbed, and is then returned to the process. The gas is then passed through sulphuric acid to recover ammonia. An apparatus for carrying out this process is described.

- 319,542. ACETALDEHYDE FROM ACETYLENE, MANUFACTURE AND PRODUCTION OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application date, December 3, 1928.

In the production of acetaldehyde from acetylene by passing it through solutions containing mercuric salts and sulphuric acid, ammonium salts are also added to the solution to prevent the formation of deposits. The ammonium salt may be ammonium sulphate, acetate, tartrate, or oxalate, and the addition of free sulphuric acid may be omitted. The proportion of ammonium salt may be 5—50 per cent.

- 319,548. NITRIC ACID, PREPARING BY THE CATALYTIC COMBUSTION OF AMMONIA WITH OXYGEN OR GASES RICH IN OXYGEN. I. W. Cederberg, 18, Pücklerstrasse, Berlin-Dahlem, Germany. Application date, December 11, 1928.

In the catalytic combustion of ammonia with oxygen in the presence of a catalyst, the temperature of the catalyst rises too high if the proportion of ammonia is above 10 per cent., while the lower explosion limit is reached with an ammonia concentration of 16 per cent. These difficulties are avoided if the combustion takes place in a contact zone after which the gases immediately pass through a cooling liquid, which may be water or nitric acid. To avoid explosion, the gas mixture passes to the contact layer through a system of capillaries. The reaction chamber may be a cylinder of chrome-nickel steel in which the contact layer is in the form of one or more transverse platinum gauzes. The ammonia-oxygen mixture

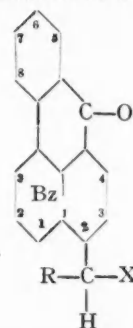
enters at the bottom through a bundle of capillary tubes immediately below the contact zone, while the cooling liquid is arranged directly above the contact zone. This liquid becomes heated, and is circulated through cooling tubes. A gas mixture containing 25 per cent. by volume of ammonia may be converted into nitric acid of about 68 per cent. strength.

- 318,582. β -ARYL- α -AMINO PROPIONIC ACIDS AND THEIR SUBSTITUTION PRODUCTS, PROCESS FOR THE MANUFACTURE OF. F. Hoffmann-La Roche and Co., Akt.-Ges., 184, Grenzacherstrasse, Basle, Switzerland. International Convention date, September 6, 1928.

These acids have been obtained as described in Liebig's *Annalen de Chemie*, Vol. 275, 1893, p. 1, by condensation of an aryl-aldehyde with hippuric acid to obtain an azlactone (lactimide). This is split with alkali into benzoyl-amido-cinnamic acid which is treated with sodium amalgam to reduce it to benzoyl-amino-propionic acid which is then saponified to obtain β -aryl- α -amino-propionic acid. The reduction and saponification could be carried out in one phase with hydriodic acid. In this invention, the azlactones are treated with hydriodic acid, acetic anhydride, and red phosphorus, by which the oxazolone ring can be opened, the benzoyl-amino-cinnamic acid hydrogenated, and the benzoyl group split off in one phase. Examples are given.

- 319,593. CONDENSATION PRODUCTS OF THE BENZANTHRONE SERIES, PROCESS FOR THE MANUFACTURE OF. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfurt-on-Main, Germany. Application dates, March 24 and August 7, 1928.

These compounds are obtained by treating with alkaline condensing agents a mixture of benzanthrone or a substitution product with free 2-position and a compound of the formula $X-CH_2-R$, where X represents the nitrile group NC-, the acid-amido group NH_2-CO- , or the acyl group R^1-CO- , in the latter case the compounds being ketones of the formula $R^1-CO-CH_2-$, in which R^1 is a hydrocarbon radicle which may be substituted and in which R may be hydrogen or an alkyl or aryl group which may be substituted, or an esterified carboxylic group. The condensation may be carried out in benzene, mono- di- or trichloro-benzene, pyridine, etc., or an excess of the organic compound to be condensed with the benzanthrone. The condensation products have the formula



and can be converted by the action of alkaline agents into salt-like compounds which dissolve in acetone or alcohol. These solutions are hydrolysed on adding water. The condensation products are initial materials for the production of dyestuffs. Examples are given of the treatment of benzanthrone and acetone, benzanthrone and acetophenone, and several others.

- 319,642. BUTYL ALCOHOL AND ACETONE, PRODUCTION OF—BY FERMENTATION. The Distillers Co., Ltd., 12, Torphichen Street, Edinburgh, and H. B. Hutchinson, 5, Spencer Road, Harpenden, Herts. Application date, June 25, 1928.

It has been found that the proportion of acetone or the proportion of butyl alcohol can be increased and the proportion

of ethyl alcohol decreased in the fermentation process by suitable selection of a nitrogenous form of nutrition. Thus the addition of ammonium acetate increases the yield of acetone, and the addition of ammonium lactate increases the yield of butyl alcohol. With this process, the raw material may be a starchy material, such as manioc, usually regarded as too poor in protein. Examples are given.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—293,001 (Schering Kahlbaum Akt.-Ges.) relating to hydrogenation products, see Vol. XIX, p. 195; 293,755 (Oesterreichische Chemische Werke Ges.) relating to hydrogen peroxide, see Vol. XIX, 243; 294,118 (Soc. of Chemical Industry in Basle) relating to basic derivatives of substituted quinoline carboxylic acids, see Vol. XIX, p. 296; 294,487 (Huttonwerk Niederschöneweide Akt.-Ges.) relating to working up materials containing lead, tin, copper, antimony, see Vol. XIX, p. 39 (Metallurgical Section); 296,376 (H. T. Bucherer) relating to carrying out chemical reactions, see Vol. XIX, p. 441; 297,062 (C. Still) relating to recovery of sulphur from gases, see Vol. XIX, p. 497; 300,129 (I.G. Farbenindustrie Akt.-Ges.) relating to homogeneous alloys of lead with alkali metals or alkaline earth metals, see Vol. XX, p. 15 (Metallurgical Section); 302,939 (I.G. Farbenindustrie Akt.-Ges.) relating to organic bases, see Vol. XX, p. 189; 303,827 (Goodyear Tire and Rubber Co.) relating to accelerators for rubber vulcanisation, see Vol. XX, p. 259.

Specifications Accepted with Date of Application

- 293,757. Esters of carbohydrates of the type $(C_6H_{10}O_5)_x$. July 11, 1927. Addition to 293,316.
- 293,874. Thymol and menthol, Manufacture of. Schering Kahlbaum Akt.-Ges. July 15, 1927. Addition to 273,085.
- 294,100. Condensates from coal-distillation gases, Recovery of. Barrett Co. July 19, 1927.
- 296,431. Valuable hydrocarbons from coal, tars, mineral oils, and the like, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 1, 1927.
- 298,152. Styrene and homologues thereof, Manufacture of. Naugatuck Chemical Co. October 4, 1927.
- 302,574. Employing cerium in the production of steel and iron, Process of. I.G. Farbenindustrie Akt.-Ges. December 17, 1927.
- 320,318. Alkali phosphates and ammonium phosphates, Production of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) June 8, 1928.
- 320,324. Water-soluble secondary diazo-amino compounds and azo dyestuffs therefrom, Manufacture of. A. Carpmæl. (I.G. Farbenindustrie Akt.-Ges.) July 4, 1928.
- 320,331. Alkali soaps, including ammonium soap, and fatty acid therefrom, Production of. V. Graubner. April 4, 1928.
- 320,332. Ferrous alloys. S. E. Dawson. April 4, 1928.
- 320,345. Xanthen dyes, Manufacture of. Imperial Chemical Industries, Ltd., A. Coulthard, and E. H. Rodd. July 7, 1928.
- 320,359. Dyestuffs, Manufacture of. S. W. Dunworth, J. Thomas, and Scottish Dyes, Ltd. July 9, 1928.
- 320,362. Artificial rubber, Production of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) March 30, 1928. Addition to 307,808.
- 320,375. Anthraquinone and its derivatives, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) July 6, 1928.
- 320,388. Electrolytic apparatus. A. E. Knowles. April 14, 1928.
- 320,397. N-dihydro-1 : 2 : 2' : 1' anthraquinone azine and derivatives thereof fast to chlorine, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) July 11, 1928.
- 320,406. Chlorination of hydrocarbons. E. E. Ayres, Jun. July 12, 1928.
- 320,409. Yellow ferric hydroxide, Manufacture of. A. Carpmæl. (I.G. Farbenindustrie Akt.-Ges.) July 12, 1928.
- 320,421. Conversion of hydrocarbons of high boiling point into others of low boiling point. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) July 7, 1929.
- 320,440. Electrolytically depositing chromium, Apparatus for. Soc. Chimique de la Seine and V. Szidon. July 28, 1928.
- 320,424. Primary alcohols, Manufacture of. A. Carpmæl. (I.G. Farbenindustrie Akt.-Ges.) July 17, 1928.
- 320,457. Organic acids and esters, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) August 16, 1928.
- 320,473. Valuable hydrocarbons, particularly those of low boiling point range, Manufacture of. J. Y. Johnson. (I.G. Farbenindustrie Akt.-Ges.) August 31, 1928.
- 289,841. Halogen substituted organic sulpho-acids and their salts, Production of. Oranienburger Chemische Fabrik Akt.-Ges. May 3, 1927.

Applications for Patents

[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]

- Bampfylde, J. W., and British Dominions Feralloy, Ltd. Catalytic treatment of organic substances. 31,948. October 21.
- Manufacture of alloys of iron and aluminium. 31,949. October 21.
- Bataafsche Petroleum Maatschappij and Elkington, H. D. Manufacture of ammonia sulphate. 32,486. October 25.
- Manufacture of aqueous dispersions of bitumen. 32,487. October 25.
- Beetz, R., and Scottish Dyes, Ltd., Benzanthrone, etc., products. 32,376. October 21.
- Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of therapeutically-valuable substances. 32,085. October 22.
- Manufacture of active carbon. 32,349. October 24.
- Protection of material from attack by micro-organisms. 32,350. October 24.
- Manufacture of derivatives of 3-nitro-4-hydroxybenzamide. 32,523. October 25.
- Chemical Reactions, Ltd., and Szeszich, L. von. Catalytic treatment of carbonaceous bodies. 32,088. October 22.
- Chemische Fabrik vorm. Sandoz. Manufacture of calcium gluconate solutions. 32,481. October 25. (Germany, October 29, 1928.)
- Clark, F. L., and Imperial Chemical Industries, Ltd. Separating iron and titanium compounds. 32,329. October 24.
- Fletcher, W. B., and Imperial Chemical Industries, Ltd. Production of titanium oxide. 32,330. October 24.
- Coley, H. E. Production of hydrocarbons. 31,911. October 21.
- Compagnie Nationale de Matières Colorantes et Manufactures de Produits Chimiques du Nord Réunies, Etablissements Kuhlmann. Apparatus to resist phosphoric acid. 31,944. October 21. (France, January 31.)
- Craigbank Chemical Co., Ltd. Bituminous paints, etc. 32,575. October 26.
- Emco Dyestuffs, Ltd., Hinchliffe, H. H., and Darby, W. J. Manufacture of monoazo dyestuffs. 32,520. October 25.
- Fletcher, W. B., and Wheeler, T. S. Carrying out chemical reactions. 32,331. October 24.
- Goodyear Tire and Rubber Co. Manufacture of nitro-phenyl derivatives of thiazole compounds. 32,472. October 25. (United States, February 6.)
- Heap, J. H. Dyeing. 32,535. October 26.
- Hurtley, W. R. H. Manufacture of esters of lactic acid. 32,447. October 25.
- I.G. Farbenindustrie Akt.-Ges. Manufacture of emulsions. 31,953. October 21. (Germany, October 20, 1928.)
- Manufacture of formic acid esters. 32,082. October 22. (Germany, October 22, 1928.)
- Manufacture of derivatives of the naphthoylene-diaryl-imidazol series. 32,083. October 22. (Germany, October 22, 1928.)
- Manufacture of cinematograph, etc., films. 32,212. October 23. (Germany, October 23, 1928.)
- Manufacture of homogeneous halogen derivatives of α -chloro-naphthalene. 32,251. October 23. (Germany, October 24, 1928.)
- Manufacture of 3,3-dichloro-4,4 dihydroxy-5 : 5' diacetyl-amino-arsenobenzene. 32,524. October 25. (Germany, October 25, 1928.)
- I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Removal of slime from oils, etc. 31,916. October 21.
- Production of motor fuels. 31,917. October 21.
- Production of aqueous dispersions. 31,918. October 21.
- Refining oxidation products of organic compounds. 32,190. October 23.
- Manufacture of vat dyestuffs of the anthraquinone acridone series. 32,191. October 23.
- Manufacture of intaglio printing inks. 32,192. October 23.
- Production of vat dyestuffs. 32,367, 32,368. October 24.
- Production of vat dyestuffs. 32,476. October 25.
- Production of wetting-agents. 32,589. October 26.
- Imperial Chemical Industries, Ltd. Making sheets, etc., of rubber from latex. 31,963. October 21.
- Production of acetaldehyde from acetylene. 31,964. October 21.
- Piggott, H. A., and Rodd, E. H. Manufacture of indole derivatives. 32,050. October 22.
- Separating gases, etc. 32,293. October 24.
- Carrying out chemical reactions. 32,331. October 24.
- Wheeler, T. S., and Mason, J. Production of chlorinated hydrocarbons. 32,332. October 24.
- Manufacture of esters of lactic acid. 32,447. October 25.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.
 ACID BORIC, COMMERCIAL.—Crystal, £20 per ton; powder, £21 per ton; extra fine powder, £23 per ton. Packed in 2 cwt. bags carriage paid any station in Great Britain.
 ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.
 ACID NITRIC, 80° Tw.—£21 10s. to £27 per ton, makers' works according to district and quality.
 ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
 AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.
 BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.
 BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s. per ton d/d, 4-ton lots.
 BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain.)
 CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.
 COPPER SULPHATE.—£25 to £25 10s. per ton.
 METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.
 NICKEL SULPHATE.—£38 per ton d/d.
 NICKEL AMMONIA SULPHATE.—£38 per ton d/d.
 POTASH CAUSTIC.—£30 to £33 per ton.
 POTASSIUM BICHROMATE.—4½d. per lb.
 POTASSIUM CHLORATE.—3½d. per lb., ex-wharf, London, in cwt. kegs.
 SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.
 SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.
 SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.
 SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.
 SODIUM ACETATE 97/98%.—£21 per ton.
 SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.
 SODIUM BICHROMATE.—3½d. per lb.
 SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.
 SODIUM CHLORATE.—2½d. per lb.
 SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.
 SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.
 SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.
 SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.
 SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.
 SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—7d. to 10d. per lb. Crude 60's, 2s. 5½d. to 2s. 6d. per gall.
 ACID CRESYLIC 99/100.—2s. 2d. to 2s. 7d. per gall. Pure, 5s. 6d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 2s. 2d. to 2s. 5d. Dark, 1s. 6d. to 2s. 2d. Refined, 2s. 7d. to 2s. 10d. per gall.
 ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.
 ANTHRACENE OIL, STRAINED, 1080/1090.—4½d. to 5½d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).
 BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.
 TOLUOLE.—90%, 1s. 9d. to 2s. 1d. per gall. Firm. Pure, 1s. 11d. to 2s. 4d. per gall.
 XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.
 CREOSOTE.—Cresylic, 20/24%, 6½d. to 7d. per gall.; Heavy, 6½d. to 6½d. per gall. Middle oil, 4½d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 2d. to 2½d. per gall. ex works. Salty, 7½d. per gall.
 NAPHTHA.—Crude, 8½d. to 8½d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent 90/190, 1s. to 1s. 3d. per gall.
 NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.
 NAPHTHALENE.—Crystals, £12 5s. per ton. Purified Crystals, £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.
 FITCH.—Medium soft, 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy, prices only nominal.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.
 ACID ANTHRANILIC.—6s. per lb. 100%.
 ACID BENZOIC.—1s. 8½d. per lb.
 ACID GAMMA.—4s. 6d. per lb.
 ACID H.—3s. per lb.
 ACID NAPHTHIONIC.—1s. 6d. per lb.
 ACID NEVILLE AND WINTHER.—4s. 9d. per lb.
 ACID SULPHANILIC.—8½d. per lb.
 ANILINE OIL.—8d. per lb. naked at works.
 ANILINE SALTS.—8d. per lb. naked at works.
 BENZALDEHYDE.—2s. 3d. per lb.
 BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.
 BENZOIC ACID.—1s. 8½d. per lb.
 o-CRESOL 29/31° C.—£3 1s. 6d. per cwt., in 1 ton lots.
 m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots d/d.
 p-CRESOL 32/34° C.—2s. per lb., in ton lots d/d.
 DICHLORANILINE.—1s. 10d. per lb.
 DIMETHYLANILINE.—1s. 11d. per lb.
 DINITROBENZENE.—8d. per lb. naked at works. £75 per ton.
 DINITROCHLOROBENZENE.—£84 per ton d/d.
 DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.
 DIPHENYLAMINE.—2s. 10d. per lb. d/d.
 a-NAPHTHOL.—2s. per lb. d/d.
 B-NAPHTHOL.—10d. per lb. d/d.
 a-NAPHTHYLAMINE.—1s. 3d. per lb.
 B-NAPHTHYLAMINE.—3s. per lb.
 o-NITRANILINE.—5s. 9d. per lb.
 m-NITRANILINE.—3s. per lb. d/d.
 p-NITRANILINE.—1s. 8d. per lb.
 NITROBENZENE.—6d. per lb. naked at works.
 NITRONAPHTHALENE.—1s. 3d. per lb.
 R. SALT.—2s. 2d. per lb.
 SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.
 o-TOLUIDINE.—8d. per lb.
 p-TOLUIDINE.—1s. 9d. per lb. naked at works.
 m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.
 N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.
 ACETONE.—£78 per ton.
 CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.
 IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.
 RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.
 WOOD CRESOTE.—1s. 9d. per gall. Unrefined.
 WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent 4s. to 4s. 3d. per gall.
 WOOD TAR.—£3 10s. to £4 10s. per ton.
 BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.
 ARSENIC SULPHIDE, YELLOW.—1s. 10d. to 2s. per lb.
 BARYTES.—£5 10s. to £7 per ton, according to quality.
 CADMIUM SULPHIDE.—5s. to 6s. per lb.
 CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity.
 CARBON BLACK.—5½d. per lb., ex wharf.
 CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.
 CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
 DIPHENYLGUANIDINE.—3s. 9d. per lb.
 INDIA RUBBER SUBSTITUTES, WHITE AND DARK.—4½d. to 5½d. per lb.
 LAMP BLACK.—£30 per ton, barrels free.
 LEAD HYPOSULPHITE.—9d. per lb.
 LITHOPONE, 30%.—£20 to £22 per ton.
 MINERAL RUBBER "RUBPRON".—£13 12s. 6d. per ton, f.o.r. London.
 SULPHUR.—£10 to £13 per ton, according to quality.
 SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
 SULPHUR PRECIP. B. P.—£55 to £60 per ton.
 THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.
 THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.
 VERMILION, PALE OR DEEP.—6s. 6d. to 6s. 9d. per lb.
 ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton ex wharf London, barrels free.

ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.

ACID, BENZOIC, B.P.—2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.

ACID, BORIC B.P.—Crystal, £32 per ton; powder, £36 per ton; extra fine powder, £38 per ton. Packed in 2-cwt. bags carriage paid any station in Great Britain.

ACID, CAMPHORIC.—19s. to 21s. per lb.

ACID, CITRIC.—2s. to 2s. 0½d. per lb., less 5%.

ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.

ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.

ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 7d. per lb. Technical.—1s. to 1s. 2d. per lb.

ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.

ACID, TARTARIC.—1s. 5d. per lb., less 5%.

ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.

AMIDOL.—7s. 6d. to 9s. per lb., d/d.

AMIDOPYRIN.—7s. 9d. to 8s. per lb.

AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.

AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimed, 1s. per lb.

AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.

ATROPHINE SULPHATE.—9s. per oz.

BARBITONE.—5s. 9d. to 6s. per lb.

BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.

BISMUTH CARBONATE.—8s. 9d. per lb.

BISMUTH CITRATE.—8s. 3d. per lb.

BISMUTH SALICYLATE.—8s. 3d. per lb.

BISMUTH SUBNITRATE.—7s. 6d. per lb.

BISMUTH NITRATE.—Cryst. 5s. 3d. per lb.

BISMUTH OXIDE.—11s. 3d. per lb.

BISMUTH SUBCHLORIDE.—10s. 3d. per lb.

BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.

BISMUTH ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb.

BORAX B.P.—Crystal, £20 per ton; powder, £21 per ton. Packed in 1- or 2-cwt. bags carriage paid any station in Great Britain.

BROMIDES.—Ammonium, 1s. 11½d. per lb.; potassium, 1s. 8½d. per lb.; granular, 1s. 7½d. per lb.; sodium, 1s. 10½d. per lb. Prices for 1 cwt. lots.

CALCIUM LACTATE.—B.P., 1s. 2d. to 1s. 4d. per lb., in 1-cwt. lots.

CAMPOR.—Refined flowers, 3s. 3d. to 3s. 4d. per lb., according to quantity; also special contract prices.

CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.

CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.

CREOSOTE CARBONATE.—6s. per lb.

ETHERS.—S.G. .730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.

FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.

GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.

HEXAMINE.—2s. 3d. to 2s. 6d. per lb.

HOMATROPINE HYDROBROMIDE.—30s. per oz.

HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.

HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchester, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.

HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.

HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.

IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb. U.S.P., 2s. 9d. to 3s. per lb.

IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.

IRON QUININE CITRATE.—B.P., 8½d. to 9½d. per oz., according to quantity.

MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.

MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.

MENTHOL.—A.B.R. recrystallised B.P., 19s. per lb. net; Synthetic, 10s. 6d. to 12s. per lb.; Synthetic detached crystals 10s. 6d. to 15s. per lb., according to quantity; Liquid (95%), 9s. per lb.

MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.

METHYL SALICYLATE.—1s. 6d. to 1s. 8d. per lb.

METHYL SULPHONAL.—18s. 6d. to 20s. per lb.

METOL.—9s. to 11s. 6d. per lb. British make.

PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.

PARALDEHYDE.—1s. 4d. per lb.

PHENACETIN.—3s. 2½d. to 3s. 7d. per lb.

PHENAZONE.—5s. 11d. to 6s. 1½d. per lb.

PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.

POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—102s. to 104s. per cwt., less 2½ per cent.

POTASSIUM CITRATE.—B.P.C., 2s. 7d. per lb. in 1 cwt. lots.

POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.

POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.

POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.

POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.

QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.

RESORCIN.—2s. 10d. to 3s. per lb., spot.

SACCHARIN.—43s. 6d. per lb.

SALOL.—2s. 3d. to 2s. 6d. per lb.

SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.

SODIUM CITRATE, B.P.C., 1911.—2s. 4d. per lb., B.P.C. 1923—2s. 7d. per lb. Prices for 1 cwt. lots. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.

SODIUM FERROCYNIDE.—4d. per lb., carriage paid.

SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.

SODIUM NITROPRUSSIDE.—16s. per lb.

SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—100s. to 105s. per cwt. Crystals, 5s. per cwt. extra.

SODIUM SALICYLATE.—Powder, 2s. 2d. to 2s. 4d. per lb. Crystal, 2s. 3d. to 2s. 5d. per lb.

SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.

SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.

SULPHONAL.—9s. 6d. to 10s. per lb.

TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.

THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. per lb.

Perfumery Chemicals

ACETOPHENONE.—7s. per lb.

AUBEPINE (EX ANETHOL).—12s. per lb.

AMYL ACETATE.—2s. 6d. per lb.

AMYL BUTYRATE.—5s. per lb.

AMYL CINNAMIC ALDEHYDE.—15s. per lb.

AMYL SALICYLATE.—2s. 9d. per lb.

ANETHOL (M.P. 21/22° C.).—6s. per lb.

BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.

BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—2s. per lb.

BENZYL ALCOHOL FREE FROM CHLORINE.—2s. per lb.

BENZYL BENZOATE.—2s. 3d. per lb.

CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.

COUMARIN.—8s. 9d. per lb.

CITRONELLO.—9s. per lb.

CITRAL.—8s. per lb.

ETHYL CINNAMATE.—6s. 6d. per lb.

ETHYL PHTHALATE.—2s. 9d. per lb.

EUGENOL.—11s. 9d. per lb.

GERANIOL (PALMAROSA).—20s. per lb.

GERANIOL.—6s. 6d. to 10s. per lb.

HELIOTROPINE.—7s. per lb.

ISO EUGENOL.—13s. per lb.

LINALOL.—Ex Bois de Rose, 12s. per lb. Ex Shui Oil, 10s. per lb.

LINALYL ACETATE.—Ex Bois de Rose, 15s. per lb. Ex Shui Oil, 12s. per lb.

PHENYL ETHYL ACETATE.—11s. per lb.

PHENYL ETHYL ALCOHOL.—9s. 6d. per lb.

RHODINOL.—56s. per lb.

SAFROL.—2s. 6d. per lb.

TERPINEOL.—1s. 6d. per lb.

VANILLIN, EX CLOVE OIL.—13s. to 15s. per lb. Ex Guaiacol, 12s. 9d. to 14s. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.

ANISE OIL.—4s. per lb.

BERGAMOT OIL.—14s. 9d. per lb.

BOURBON GERANIUM OIL.—19s. 6d. per lb.

CANANGA OIL, JAVA.—11s. 6d. per lb.

CASSIA OIL, 80/85%.—5s. 6d. per lb.

CINNAMON OIL LEAF.—8s. 6d. per oz.

CLOVE OIL (90/92%).—8s. 3d. per lb.

EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10d. per lb.

LAVENDER OIL.—Mont Blanc, 38/40%, 14s. 3d. per lb.

LEMON OIL.—14s. per lb.

LEMONGRASS OIL.—4s. per lb.

ORANGE OIL, SWEET.—15s. per lb.

PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 15s. 6d. per lb.; Japanese, 5s. 3d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, October 31, 1929.

THE improved demand for the majority of chemicals continues, with prices showing a firmer tendency. The improvement in the export trade also continues.

General Chemicals

ACETONE.—Firm at £75 to £85 per ton, according to quantities, and in steady demand.
ACETIC ACID.—Unchanged at £36 10s. for 80% technical, with usual extra for edible quality, and in good demand.
ACID CITRIC.—This is in very slow demand, with prices unchanged at about 2s. 3d. per lb., less 5%.
ACID LACTIC.—50% by weight, usual pale quality, is firm at £43 per ton, and in active demand.
ACID OXALIC.—Firm at £30 7s. 6d. per ton to £32 per ton, according to quality, and in fair demand.
ACID TARTARIC.—Remains steady at about 1s. 4½d. per lb. to 1s. 5d. per lb., less 5%, with a slightly improved demand.
ALUMINA SULPHATE.—Unchanged at £7 15s. to £8 per ton for 17-18% quality. Position is very firm and demand active.
ARSENIC is unchanged at £16 17s. 6d. per ton, free on rails at mines.
BORAX is in steady demand at £13 per ton.
CREAM OF TARTAR is in steady demand at £104 to £109 per ton. The position is very firm.
COPPER SULPHATE.—About £28 per ton, less 5%. Demand continues brisk and position firm.
FORMALDEHYDE is unchanged at about £36 per ton, with a considerably increased demand.
LEAD ACETATE.—Firm at £44 per ton for white, brown £43 per ton, and in steady request.
LEAD NITRATE.—Unchanged at £33 15s., and in steady demand.
LIME ACETATE.—Unchanged.
LITHOPONE is in steady request at £19 15s. to £23 per ton, according to grade.
METHYL ACETONE is unchanged and steady at £58 10s. per ton.
POTASSIUM CARBONATE.—£27 per ton for 96/98%, and in good demand.

Nitrogen Products

Sulphate of Ammonia.—The demand for sulphate of ammonia appears to be small, both in the United States and on the Continent. This is partly due to large sales already made and a general tendency to hold off in view of the large production now made synthetically. It is understood that the U.K. sellers are still holding for £8 18s. 9d. per ton, f.o.b. U.K. port, in new single bags, basis 20.6% nitrogen.

Home.—There is little interest in the home market except that large sales are made from time to time for shipment to Ireland.

Nitrate of Soda.—The market for this product remains listless. Sales have been behind production since July, though the material continues to be offered at scale prices. It is interesting to observe that the production for September showed a decline on that of the previous month and on that of September of the previous year. This, of course, may be due only to local causses.

Latest Oil Prices

LONDON, OCTOBER 30.—LINSEED OIL was steady, unchanged to 5s. per ton higher. Spot, ex mill, £44 10s.; November, £41 2s. 6d. December, £40 15s.; and January-April, £40 2s. 6d., naked. RAPE OIL was slow. Crude extracted, £43; technical refined, £44 10s., naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £32 10s.; refined common edible, £37 10s.; deodorised, £39 10s., naked, ex mill. TURPENTINE was dull and 9d. per cwt. lower. American, spot, 42s.; November-December, 42s. 6d.; January-April, 44s.

HULL.—LINSEED OIL.—Spot and October, £43 5s.; November, £43 2s. 6d.; November-December, £43; January-April, £43 per ton, naked. COTTON OIL.—Egyptian crude, spot, £31 10s.; November-December, £30 10s.; edible refined, spot, £35; technical, spot, £34 10s.; deodorised, spot, £37 per ton, naked. PALM KERNEL OIL.—Crude, naked, 5½ per cent., spot, £33 per ton. GROUNDNUT OIL.—Crushed/extracted, spot, £36 10s.; deodorised, spot, £40 10s. per ton. SOYA OIL.—Extracted and crushed, spot, £34; deodorised, spot, £37 10s. per ton. RAPE OIL.—Crushed/extracted, spot, £41 10s.; refined, spot, £43 10s. per ton. TURPENTINE.—Spot, 44s. 6d. per cwt. CASTOR OIL and COD OIL unaltered.

South Wales By-Products

THERE is less activity in South Wales by-products. The demand for pitch has slackened, but quotations are unchanged on a basis of 47s. to 49s. per ton delivered. Solvent and heavy naphthas remain inactive, solvent being quoted at from 1s. 3d. to 1s. 6d.

POTASSIUM CHLORATE.—Firm at £30 per ton, and in steady request.

POTASSIUM PERMANGANATE.—Position is very firm at 5½d. to 5¾d. per lb. for B.P. quality, and in active demand.

POTASSIUM PRUSSATE.—Firm at £63 10s. to £65 10s. per ton. The increased demand continues.

SODIUM ACETATE.—£22/23 per ton for white crystals, which are still short.

SODIUM BICHROMATE.—Unchanged at 3¾d. per lb., with a regular and steady demand.

SODIUM HYPO, PHOTOGRAPHIC QUALITY.—£14 10s. to £15 per ton, commercial £8 10s. to £9, and in steady request.

SODIUM NITRATE.—Firm at £20 per ton, with a steady demand.

SODIUM PHOSPHATE TRIBASIC.—£17 18s. per ton, dibasic £12 per ton, and in steady demand.

SODIUM PRUSSATE.—Firm at 4¾d. to 5½d. per lb., and in good demand.

TARTAR EMETIC.—Firm at 11½d. per lb.

ZINC SULPHATE.—Firm at £13 10s. per ton, and in steady request.

Coal Tar Products

There is very little change to report in the market for coal tar products. Prices remain about the same, but there is a distinct firmness in the prices of benzols and naphthas.

MOTOR BENZOL is firm at about 1s. 5½d. to 1s. 6d. per gallon, f.o.r. makers' works.

SOLVENT NAPHTHA is quoted at about 1s. 2½d. to 1s. 3d. per gallon, f.o.r.

HEAVY NAPHTHA remains at about 1s. 1d. per gallon, f.o.r.

CREOSOTE OIL is quoted at 3½d. to 4d. per gallon on rails in the North, and at 4½d. per gallon in London.

NAPHTHALENES remain about at £4 10s. per ton for the firelighter quality, at £5 per ton for the 74/76 quality, and at £6 to £6 5s. per ton for the 76/78 quality.

PITCH.—The market was rather easier at a maximum figure of 47s. 6d. per ton, f.o.b. East Coast port.

per gallon, and heavy naphtha from 11d. to 1s. 1d. per gallon. Road tar has a steady, though moderate, call at 11s. to 14s. per 40-gallon barrel. More interest is being shown in sulphate of ammonia, but there is no record of any actual business done. There is no change in creosote, which remains weak at 3d. to 4½d. per gallon. Refined tars have a fairly good call, with values of coke-oven and gasworks' tar unchanged. Coke and patent fuel shipments are unchanged.

Scottish Coal Tar Products Market

INTEREST during the week has been centred on blast furnace pitch, which is on the point of being further controlled. Under the new administration the ironmasters hope to obtain better prices. Cresylic acids are still commanding good prices and creosote oil is changing hands in fair quantities.

Cresylic Acid.—A firm market with supply short of demand. Pale, 97/99%, 1s. 11½d. to 2s. 0½d.; dark, 97/99%, 1s. 9½d. to 1s. 10½d.; pale, 99/100%, 2s. 2d. to 2s. 4d., all per gallon free on rails.

Carbolic Sixties.—No business has been done and price is nominal at 2s. 4d. to 2s. 6d. per gallon.

Creosote Oil.—Position is unchanged from last week. Certain grades are in fair demand. B.E.S.A. Specification, 4½d. to 5d. per gallon; gas works ordinary, 3½d. to 3¾d. per gal.; washed oil, 3½d. to 3¾d. per gal., all ex works.

Coal Tar Pitch.—Orders are not as numerous as they should be at this season. Local tar distillers are comfortably placed, however, as stocks are very low owing to recent abnormal demand for tar. Nominal prices are:—Coke oven and horizontal, 47s. 6d. f.a.s. Glasgow; vertical, 45s. f.a.s. Glasgow.

Blast Furnace Pitch.—While controlled price remains at 30s. per ton rails works for home trade, and 35s. per ton f.a.s. Glasgow for export, a rise is considered not unlikely within the next week or two.

Refined Coal Tar is surprisingly steady for the season. Quotations have advanced to 3¾d. to 4d. per gal., ex works, in buyers' packages with a premium for forward delivery.

Blast Furnace Tar is unchanged at 2¾d. per gal., ex works.

Crude Naphtha.—Supplies are scarce and to-day's value may be taken as 4¾d. to 5¾d. per gal., according to quality and district.

Water White Products.—Market is slow and quotations are, if anything, lower. 90/160 Solvent naphtha, 1s. 2½d. to 1s. 2¾d. per gal.; heavy solvent, 90/190, 1s. 0½d. to 1s. 1d. per gal.; benzol, 1s. 5d. to 1s. 5¾d. per gal., all per gal. in bulk quantities.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, October 30, 1929.

DURING the past week business in the heavy chemical market has been fairly good, particularly in regard to export inquiries. Prices remain practically on the same level as last reported.

Industrial Chemicals

ACETONE, B.G.S.—£76 10s. to £85 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—This material is still scarce for immediate supply, but prices remain unchanged as follows: 98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton. Powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Prompt delivery difficult to obtain and prices now quoted for early delivery round about 8d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2d. per lb., less 5%, ex store, prompt delivery. Rather cheaper offers for early delivery from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy; dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC, 80% QUALITY.—£24 10s. per ton, ex station, full truck loads.

ACID OXALIC, 98/100%.—On offer at about 3½d. per lb., ex store. Offered from the Continent at 3½d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton ex works for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Quoted 1s. 5d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £7 10s. per ton, ex store.

ALUM. LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal about 2s. 6d. per ton less.

AMMONIA, ANHYDROUS.—Quoted 7½d. per lb., carriage paid. Containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton, powdered £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material quoted £37 per ton, ex wharf. On offer for prompt shipment from China at £34 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Now quoted £18 per ton, ex wharf, prompt despatch from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price £4 5s. per ton to £4 15s. per ton, according to quantity and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.b. works, or £4 12s. 6d. per ton f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Remains steady at about £36 10s. per ton, ex works.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—Price now £37 10s. per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½%, delivered.

POTASSIUM BICHROMATE.—Quoted 4½d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton ex store. Offered from the Continent at £25 5s. per ton c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99½/100% POWDER.—Quoted £25 10s. per ton ex wharf. Crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5½d. per lb., ex wharf.

POTASSIUM PRUSSIAN (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6½d. per lb. ex wharf.

SODA, CAUSTIC.—Powdered 98/99% £17 10s. per ton in drums, £18 15s. per ton in casks. Solid 76/77% £14 10s. per ton in drums, and £14 12s. 6d. per ton for 70/75% in drums, all carriage paid buyers' stations, minimum 4-ton lots, for contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3½d. per lb. delivered buyers' premises with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or Pea quality 27s. 6d. per ton extra. Light soda ash £7 1s. 3d. per ton ex quay, minimum 4-ton lots with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers are now offering at £9 9s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, but demand in the meantime is small.

SODIUM PRUSSIAN.—Quoted 5½d. per lb., ex store. On offer at 5d. per lb., ex wharf to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works, 52s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid 60/62% £9 per ton. Broken 60/63% £10 per ton. Crystals 30/32% £7 2s. 6d. per ton delivered buyers' works on contract, minimum 4-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £10 7s. 6d. per ton; ground American, £9 5s. per ton; ex store.

ZINC CHLORIDE, 98%.—British material now offered at round about £20 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £10 per ton, ex wharf.

NOTE.—Please note that the above prices are for bulk business and are not to be taken as applicable to small parcels.

Ontario Lignite Discovery

Area of Field Estimated at Two Square Miles

EXPLORATION of the field of lignite recently uncovered by the Ontario Department of Mines at Blacksmith Rapids, on the Abitibi River, 126 miles north of Cochrane, has shown that the deposits cover an area four times larger than at first estimated. The diamond drilling discloses the area so far indicated as underlain by lignite as approximately two square miles. The average thickness of the bed is about 20 ft. Six additional holes have been drilled on the banks of the Onakawana River, parallel tributary to the Abitibi, since the first announcement of the discovery, covering a distance of more than 9,300 ft. The lignite in the six holes was found to be of the following thicknesses: 24 ft., 18 ft., 13 ft., 16 ft., 14 ft. and 9 ft. Drilling will proceed west of the Onakawana.

The original statement of the Premier of the Province, the Hon. G. H. Ferguson, on the discovery of the Abitibi River coal area was that it was capable of producing between 7,000,000 and 10,000,000 tons of good grade lignite from the area one mile long and a half-mile wide at that time disclosed. Later estimates by Mines Department officials indicated 20,000,000 tons. Constant extension of the area is indicated in the latest information. Clearings are being made at Blacksmith Rapids for cabins, and sites for three shafts have been chosen. One hundred tons of coal will be taken out for test purposes during the winter, and the overlying burden will be carefully studied as to methods of mining. Experts of the Ontario Research Foundation are expected to be called on to make further assays and experiments with the coal.

Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, October 31, 1929.

SLACKNESS of varying degree in the textile, paint, leather, and other chemical-consuming industries of the district does not make for the maximum demand for chemical products, and reports this week have not in some instances been of too cheerful a character. On the whole, however, the buying movement has not been unsatisfactory having regard to prevailing conditions, and a fair number of inquiries are in circulation, though most of them relate to comparatively small lots.

Heavy Chemicals

Current offers of saltcake range from £2 15s. to £3 per ton, and are on a steady basis. Bicarbonate of soda is selling with a fair amount of freedom, and prices are quite firm on the basis of £10 10s. per ton. A quietly steady demand has been reported this week in the case of bichromate of soda, with values in the neighbourhood of 3½d. per lb. Chlorate of soda is not too active still, but prices keep up at about 2½d. per lb. With regard to caustic soda, prices in this section are well maintained at from £12 15s. to £14 per ton, according to quality, and a fair amount of buying interest is being experienced. The demand for sulphide of sodium this week has been rather slow, but there has been little change in the price position, the 60 to 65 per cent. concentrated solid quality being available at round £9 per ton, and the commercial grade at £8. A quiet business is going through in the case of phosphate of soda and offers keep up at about £11 10s. per ton. Firmness continues in evidence in the case of alkali, a fair trade being reported at round £6 per ton. Prussiate of soda is attracting a moderate amount of attention still and quotations are well held at from 4½d. to 5½d. per lb., according to quantity. Hyposulphite of soda is only in comparatively quiet request at the moment, but prices are steady at about £9 5s. per ton for the commercial quality and £15 10s. for the photographic.

Among the potash products, permanganate is the subject of a quiet trade at a steady range of prices, with the B.P. grade now selling at round 5½d. per lb., and the commercial material at 5½d. Current offers of chlorate of potash are at 2½d. to 3d. per lb., with the demand in this section not particularly active. Carbonate of potash is moving off in moderate quantities on this market and values are fully maintained at up to £25 10s. per ton for the 96 to 98 per cent. quality. Yellow prussiate of potash is in fair request still, and quotations are firm at from 6½d. to 7½d. per lb., according to quantity. Caustic potash is on offer at from £32 10s. per ton upwards, and a moderate amount of buying interest is being shown. Bichromate of potash continues very steady at round 4½d. per lb., and a fair business is still reported.

A moderate inquiry is about for sulphate of copper, and current quotations are at £26 10s. to £27 per ton, f.o.b. There has been no appreciable improvement in the demand for arsenic, though values keep up at about £16 per ton at the mines for white powdered, Cornish makes. The acetates of lime are fairly firm at £8 per ton for brown quality and £16 to £16 10s. for grey, without, however, any big weight of business going through. Nitrate of lead is quiet and easy in tendency at round £33 per ton. The acetates of lead show little alteration in the price position, the white product being quoted at £40 per ton and the brown at £39.

Acids and Tar Products

In the acid section, oxalic continues to display marked steadiness at round £1 13s. per cwt., ex store, and a fair inquiry is reported. Neither in citric nor tartaric, however, is the demand at all active, and prices appear to be easing a little at 2s. and 1s. 4d. to 1s. 4½d. per lb. respectively. Acetic acid is as firm as ever, and a steady trade is passing at about £36 per ton for the 80 per cent. commercial quality and £66 for the glacial.

Among the by-products, creosote oil is quoted this week at from 4d. to 4½d. per gallon, naked at works, but the demand is rather slow. Pitch is only in moderate request at up to about 47s. 6d. per ton, f.o.b. Solvent naphtha is fairly steady at from 1s. 2d. to 1s. 3d. per gallon, a quietly steady business being done. Firmness continues to characterise

carbolic acid, and available parcels of crystals in second-hands are being sold at from 10d. to 11d. per lb., with crude 60's at about 2s. 4d. per gallon, naked.

Important Monsanto Acquisition

Merger with the Merrimac Chemical Co.

MR. EDGAR M. QUEENY, president of the Monsanto Chemical Works of St. Louis, U.S.A., announces the acquisition by his company of the Merrimac Chemical Co. of Boston, the exchange of stock involved approximating to seven million dollars. The Merrimac Co. is the oldest and largest chemical concern in New England, and its acquisition places the St. Louis company among the largest in the States, with a total capital of about \$24,000,000. The Merrimac works are located at Woburn and Everett, Mass., and employ about 850 men. The dock accommodation at Boston is regarded as of great importance to the future of the joint concern, as its tidewater location will facilitate the manufacture of products dependent on Eastern or foreign raw materials. The consolidated annual sales of the Monsanto Co., as the result of the present merger, are estimated at \$18,000,000, and the employees number 2,700.

Incorporated at Missouri in 1901, the Monsanto Co. has declared a profit every year since its establishment and has from time to time acquired other important works, including the Commercial Acid Co. of East St. Louis, the Rubber Service Laboratories Co., the Elko Chemical Co., and the Mathieson Alkali Works. In this country it owns the well-known works situated at Ruabon, North Wales. In 1920 the Monsanto Co. purchased a 50 per cent. interest in the firm of R. Graesser, Ltd., of Ruabon, and since then the works have been operated under the name of Graesser-Monsanto Chemical Works, Ltd. This company is stated to be the largest producer of refined tar acid in this country, and last year its ownership passed completely into the hands of the Monsanto interests. For the present the Merrimac Co. will be operated as a subsidiary, with no change in the personnel.

China Clay in South Devon

At several meetings in South Devon recently hostile resolutions were passed in connection with the proposal to create China Clay works at Broad Down, near Postbridge, on Dartmoor. At a meeting of the Dart Board of Conservators, it was stated that representations on the matter had already been addressed to the Duchy of Cornwall, and to these the following reply had been made by Sir Walter Peacock: "I do not think there is any need for you to be apprehensive about the fishery of the Dart. The most stringent clauses protecting the fishery will be inserted in any lease, and as the lessees will have plenty of funds and are quite satisfied that these are sufficient of preventing pollution, I do not anticipate any trouble." The chairman, Mr. D. M. Waterson, said that there was a growing public opinion that Dartmoor should be reserved as a national park. If the estuary were going to become a white estuary it would spoil Dartmouth. If the Dart were polluted, it might endanger water supplies to Paignton, Brixham, Teignmouth and Devonport. After a prolonged discussion, in which it was mentioned that a report on the subject was being drawn up by Mr. R. H. Worth, it was agreed that when the report was available a conference of local authorities, riparian owners and millowners should be called to discuss the whole question and consider how the river was likely to be affected by the proposed industry.

New Benn Books

AMONG the books announced for publication by Ernest Benn, Ltd., are the following:—

On Board the Emma: Adventures with Garibaldi's Thousand in Sicily, by Alexandre Dumas, translated and with an Introduction by R. S. Garnett (21s.); *Our New Religion*: An Examination of Christian Science, by the Rt. Hon. H. A. L. Fisher, F.R.S., Warden of New College, Oxford (6s.); *King George V: In His Own Words*, by F. A. Mackenzie (12s. 6d.); *The American Illusion*, by Collinson Owen (12s. 6d.); *Dead Souls*, by Nikolai Gogol (3s. 6d.); *Laughing Ann and Other Poems*, by A. P. Herbert (3s. 6d.); *Richard Cobden*, by Sir Charles Mallet (1s.); *Peter the Great, A Life of Peter I of Russia*, called *The Great*, by Stephen Graham (21s.).

Company News

BURT, BOULTON AND HAYWOOD.—A final dividend of 5 per cent. is payable on November 1.

NEW TAMARUGAL CO.—The annual meeting will be held at the Chile Office, No. 709, Calle Blanco, Valparaiso, on December 30.

CHLORIDE ELECTRICAL STORAGE.—An interim dividend of 10 per cent., free of tax, has been declared on "A" and "B" shares, against 5 per cent. on the old shares.

NITRATE PRODUCERS' STEAMSHIP CO.—The company announces an interim dividend of $7\frac{1}{2}$ per cent. per annum, free of tax, for the half-year, payable on November 1.

RUTHS STEAM STORAGE.—A loss is reported, for the sixteen months ended August 31, of £45,068. During the last four months an improvement is stated to have taken place in the conditions governing the market.

CHEMICAL BANK AND TRUST.—The financial statement of the Chemical Bank and Trust Co. of New York at September 27 shows capital, surplus and undivided profits of \$36,317,435, deposits \$265,391,999, and total assets \$333,165,620.

NEW TRANSVAAL CHEMICAL CO.—A profit of £50,975 is announced for the year to June 30 last, compared with £56,224 for the previous 12 months. An ordinary dividend of $12\frac{1}{2}$ per cent. is to be paid, as before, and the carry-forward is reduced from £9,994 to £5,089.

ACETEX SAFETY GLASS CO.—The directors announce that the accounts from June 29, 1928, to June 30, 1929, show a loss of £25,741, which is after charging the whole of the expenses from the date of the public issue, the cost of development and £2,422 for depreciation.

NEUCHÂTEL ASPHALTE CO.—The directors report that an estimate of the general trading results of the current financial year does not compare favourably with those of the previous year and they have consequently decided not to declare an interim dividend in respect of the year ending December 31 next.

BROKEN HILL PROPRIETARY CO.—A cabled message from the head office at Melbourne states that owing to the prolongation of the coal trouble on the Newcastle, N.S.W., fields, resulting in lower output and higher costs of production, combined with the general depression in trade, the board have decided that they are unable to declare the usual half-yearly dividend.

ELECTROLYTIC ZINC COMPANY OF AUSTRALASIA.—After transferring £145,000 to depreciation reserve, the gross profit for the past year was £464,697; £177,589 was brought forward; to debenture sinking fund reserve is placed £12,100; towards development and new plant for West Coast mines £50,000; leaving to be carried forward £171,407.

LEEDS FIRECLAY.—The profits for the year ended June 30 were £87,232, and £10,105 was brought forward. The directors recommend a final dividend of $6\frac{1}{2}$ per cent. on the preference shares and of $6\frac{1}{2}$ per cent. on the ordinary shares, carrying forward £20,148. The reserve fund has been increased from £172,500 on June 30, 1928, to £291,406 on June 30, 1929, by the addition of the premium on preference shares issued during the year, less the expenses of the issue.

SCOTTISH AGRICULTURAL INDUSTRIES.—The directors announce a dividend of 3 per cent. actual on the ordinary shares for the half-year to June 30, 1929. After meeting the preference dividend and carrying £8,250 to preference dividend reserve, there remains £1,973 to be carried forward. The company, which is controlled by Imperial Chemical Industries, was incorporated in Edinburgh on December 19, 1928, to consolidate fertiliser and feeding stuffs industry in Scotland.

LIVERPOOL NITRATE CO.—The local board in Valparaiso, Chile, at a meeting held on October 23, 1929, decided to pay an interim dividend for the year 1929-1930 of 1s. 3d. per share, subject to British income-tax. It is stated that owing to unavoidable delay in Chile, the transfer of the property of the Salar del Carmen Nitrate Syndicate, Ltd. (in liquidation) was not completed until October 16, and the interim dividend now announced fulfils the undertaking given by the Liverpool

Company to the syndicate in Clause 9 of the sale agreement dated May 21, 1929.

LEWIS BERGER AND SONS.—The profit for the year ended July 31, 1929, including dividends from subsidiary companies, was £121,593, in contrast with £114,157 last year. Adding the balance brought forward of £23,758, there is a total of £145,351. There were paid during the year an interim dividend on preference shares, absorbing £14,000, and an interim dividend of 5 per cent. on ordinary shares, taking £26,354, leaving £104,998. Since the end of the financial year the dividend on the preference shares for the half-year to September 30, 1929, has been paid, amounting to £14,000, leaving available £90,998. The directors recommend that it should be appropriated by the payment of a final dividend of 5 per cent., being 1s. per share on the ordinary shares, making as last year a total of 10 per cent., requiring a further £26,364, placing to general reserve £25,000, against £50,000 last year, when £20,000 was also placed to contingencies reserve, a balance of £39,634 being carried forward.

The Superphosphate Industry

Prospects for the Coming Year

At the annual general meeting of the Anglo-Continental Guano Works, in London, on Wednesday, the deputy-chairman, Mr. J. S. Holmes, who presided, said that for a number of years their profits had been adversely affected by the imports of fertilisers, particularly superphosphate, from the Continent. This still continued, although the competition was not so severe as it had been; and they believed that through the International Association of Superphosphate Manufacturers co-operation was likely to take the place of competition. This International Association, of which their managing director, Mr. E. G. Martens, had for the third time been unanimously elected president, was doing excellent work in research and propaganda, and was bringing before the world the imperative use of phosphoric acid in the production of all foodstuffs. The Association's experimental station at Hamburg had already achieved much useful work, the results of which were being circulated throughout the agricultural world. They felt that this practical co-operation among the manufacturers in all countries could hardly fail to bring about a more sane procedure in the disposal of their production than had been in evidence in recent years.

Mr. E. G. Martens said that one important item in their programme was the improvement of the physical condition of superphosphate so that it might be still more easily sown by machines on the farm. He had personally inspected various processes, and he hoped as soon as possible to see a plant erected in one of their factories which would deliver superphosphate containing a much lower percentage of moisture than at present. If that installation proved, as he expected, economical and profitable, they ought to adopt it for all the factories, and they would then be in trim for an increased trade at all points.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CHEMICAL AND PHARMACEUTICAL MATERIALS; ARTIFICIAL MANURES.—A firm of millers and agricultural merchants in Zagreb desire to get into touch with British firms with a view to arranging an exchange of goods. The firm are interested in the import into Jugo-Slavia of the products specified above, against which they are prepared to export to the United Kingdom agricultural products, cattle, timber, etc. British firms who desire further particulars should apply to the Legation of the Kingdom of the Serbs, Croats and Slovenes, 195, Queen's Gate, London, S.W.7.

INDUSTRIAL CHEMICAL PRODUCTS AND DRUGS.—An agent of good standing in Barcelona wishes to get into touch with British manufacturers with a view to representing them on a commission basis. (Reference No. 493.)

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Fertiliser Manufacture in Canada

Production, Imports and Exports

THE utilisation of fertilisers in Canada has not hitherto been carried on so thoroughly as is common in many older countries. Nevertheless, much attention is being given to the matter, and one important metallurgical plant in British Columbia is finding it advantageous to spend many millions of dollars on the establishment of a plant for the utilisation of by-product sulphuric acid in conjunction with local phosphate deposits and to produce therefrom superphosphate fertilisers for distribution on the prairies. This plant will not be in operation for some time yet, but the production of complete fertilisers in Canada in 1928 reached a total value of \$2,189,986. This total is additional to the output of \$7,951,502 representing fertiliser materials such as calcium cyanamide, ammonium sulphate, animal tankage, ground bone and fish fertilisers.

Only 12 plants in Canada produced complete fertilisers as their major product during 1928. Capital employed in these plants amounted to \$2,131,905, and the average number of persons employed the year round was 251. Payments in salaries and wages totalled \$281,109, and materials used in manufacture cost \$1,446,800.

Complete Fertilisers

Complete fertiliser was the major product of the industry. In 1928 production amounted to 53,799 tons, worth \$1,990,830, or 90 per cent. of the total output of the industry. Superphosphate was actually made in only one plant, although several other manufacturers of complete fertiliser sold quantities of superphosphate after dilution with a filler to meet the requirements of the trade. One concern was engaged solely in grinding and preparing basic slag. Production of complete fertiliser by firms in other industries amounted to 29,381 tons, worth \$944,818, while ammonium sulphate, cyanamide, animal tankage, fish fertiliser and ground bone, used extensively as fertiliser, were also produced by concerns classified in other industries.

Imports of fertilisers and fertiliser materials during the calendar year 1928 amounted in value to \$5,019,841. This total included superphosphate, manufactured fertilisers, sodium nitrate, muriate and sulphate of potash, basic slag, and ammonium sulphate. Exports, valued at \$5,370,836, included cyanamide, ammonium sulphate and manufactured fertilisers.

In this connection it may be of interest to note that the Natural Resources Intelligence Service at Ottawa recently issued a detailed study of the fertiliser situation in Canada, under the title of "The Fertilisers Industry in Canada," copies of which can be obtained on application to the Secretary, Office of the High Commissioner of Canada, the Canadian Building, Trafalgar Square, London, S.W.1.

Progress of Onslow China Clays

It is reported that considerable progress has been made by Onslow China Clays, Ltd., a company formed last May to develop China Clay-bearing land between Rough Tor and Bodmin. At the pit at Hawkstow Marshes developments are proceeding, and at Newbridge a large drying kiln is being constructed. The enterprise is already absorbing considerable unemployment in the Bodmin district, and nearly 200 men are being employed in its various branches. Operations at Newbridge, which is near Bodmin Road Station, on the main Great Western Railway line, and within a few miles of the port of Fowey, also include the construction of a siding to connect the kiln with the railway, and the provision of additional kilns is being contemplated. The works are connected to the kilns by a pipe line approximately eleven miles in length.

Election of Honorary Fellows of Chemical Society

At the meeting of the Chemical Society on Thursday, October 17, the following were elected Honorary Fellows:—Professors M. Bodenstein, Niels Bohr, Sir William Bragg, P. Debye, A. Hantzsch, Dr. Irving Langmuir, Professors W. Nernst, W. Ostwald, Sir Ernest Rutherford, O. Wallach, and H. Wieland.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

SELLIS CO., Fecto Works, Wellington Street, Leicester. disinfectant manufacturers. (C.C., 2/11/29.) £12 17s. 8d. September 10.

SMARTS (B.), LTD., Castle Mills, Green Street, Northampton, dyers. (C.C., 2/11/29.) £17 18s. 4d. October 2.

WYNOST MANUFACTURING CO., LTD., 176, Upper Brook Street, Manchester, chemists and druggists. (C.C., 2/11/29.) £17 18s. 5d. October 1.

London Gazette, &c.

Company Winding Up Voluntarily

SANTIAGO NITRATE CO., LTD. (C.W.U.V., 2/11/29.) By special resolution, October 9, confirmed October 24, W. J. Welch, 27, Leadenhall Street, London, E.C.3, appointed as liquidator.

Partnership Dissolved

SMITHSON AND CO. (George Thomas SMITHSON and William GREEN), dyers and scourers, Calder Vale Dyeworks, Healey Road, Ossett, as from October 1, 1929, so far as concerns W. Green, who retired from the firm. Debts received and paid by G. T. Smithson, who will continue the business on his own account.

New Companies Registered

CHEMICAL BUILDING PRODUCTS, LTD., Kern House, 36/38, Kingsway, London, W.C.2.—Registered October 29. Nominal capital, £2,000 in £1 shares. Manufacturers of and dealers in chemicals and chemical products of all kinds, dyes and dyestuffs, whether natural, synthetic or mineral; paints, pigments, varnishes, colouring matter, and all chemicals and chemical products used for building and/or constructional purposes, and in connection with drying, waterproofing and damp-proofing purposes, etc. A subscriber: C. T. Shaw, 240, Pinner Road, Harrow.

DUBUIS AND ROWSELL, LTD., Duroma Works, Elmwood Road, Croydon.—Registered October 28. Nominal capital, £2,500 in £1 shares. To acquire the business of manufacturers of and dealers in essential oils, perfumes, flavouring essences and fruit extracts carried on by P. L. Dubuis and F. R. Rowsell at Duroma Works, Elmwood Road, Croydon, as "Dubuis and Rowsell." Directors: P. L. Dubuis and F. A. Rowsell.

LIND PETROLEUM PRODUCTS, LTD., Chandos House, Buckingham Gate, Westminster, London, S.W.1.—Registered October 26. Nominal capital, £3,000 in £1 shares. Suppliers, distributors, storers, producers and refiners of petroleum and petroleum products, etc. Directors: E. N. A. Lind, Q. E. M. A. King, Susie L. James.

Power Alcohol Production in Australia

ACCORDING to a report from the U.S. Assistant Trade Commissioner at Sydney, the Minister of Agriculture of New South Wales has stated that as a result of investigations made by Commonwealth authorities and by the Colonial Sugar Co., it has been concluded that power alcohol cannot be produced from vegetable growth on an economical basis in Australia. The statement of the Minister for Agriculture was made to a representative of the recently formed Alcohol Research Council of New South Wales, who had called upon him to inquire as to the possibility of producing alcohol, not only from potatoes, beet and grain, but also from fruits and other vegetables. They hope that a means might be devised whereby windfalls and diseased crops might be utilised in the production of power alcohol.

